12-2010

Youth Can! Grow Healthy!

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To the Graduate Council:

I am submitting herewith a thesis written by Andrew Nils Carberry entitled "Youth Can! Grow Healthy!." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Marsha L. Spence, Major Professor

We have read this thesis and recommend its acceptance:

Hollie A. Raynor, Betsy Haughton

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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Youth Can! Grow Healthy!

A Thesis Presented for
the Master of Science Degree
The University of Tennessee, Knoxville

Andrew Nils Carberry

December 2010

Acknowledgements

I would like to thank my advisor Dr. Marsha Spence for her guidance and for sharing her zeal for youth development throughout this project. I also thank Dr. Hollie Raynor and Dr. Betsy Haughton for their constructive feedback, shared knowledge, and flexibility while serving on my thesis committee. This project would not have been possible without the help of Khann Chov and Claire Godschalk from Beardsley Community Farm, and Emily Gonzalez from University of Tennessee Agricultural Extension. Principal Carmelita Perry is a champion for the students she serves and also made this project possible. I would like to express gratitude to the Tennessee Foundation for Agriculture in the Classroom for providing funding for our school garden.

Abstract

This study presents a formative evaluation of an afterschool program that combined youth development and school garden curricula. This program used a novel approach to teach elementary school children about fruits and vegetables and to engage them in advocacy for the physical activity and nutrition environments in their community. The youth development curriculum included sessions on team building, community pride, healthy eating and physical activity, and advocacy. Photovoice was used as a method to allow participants to assess their community and communicate findings with leaders. Participants selected community leaders to invite to their school and shared their findings via a presentation of the photographs and a plan for action. The school garden curriculum included lessons on plant parts, plant nutrients, site evaluation, and pollination. Participants planted and harvested vegetables in a raised bed constructed at their school. Formative evaluation was conducted through the use of an evaluation form to collect information about each session. Evaluations were examined to provide recommendations to strengthen future program design and implementation. Themes of the evaluation were: successful methods for engaging youth, issues within the social environment, and implications for program management. Successful methods for engaging youth included creative activities, working in pairs, and experiential activities. Issues in the social environment were behavioral problems, shyness, gender groups, and competition. Areas of concern for program management included recruitment, attendance, volunteer training, team building activities, and survey administration.

Table of Contents

Chapter I: Introduction and Literature Review:

Introduction

Childhood overweight and obesity are significant public health problems in the United States. The percentage of children ages six- to eleven- years-old who are obese increased from 11.3 to 15.1 from the years of 1988-1994 to the years of 2003-2006, respectively (1). Over the past 30 years, the number of overweight and obese children in the United States has tripled (2, 3). This increase in overweight and obesity is positively associated with many negative health outcomes (4).

Obesity and poor dietary habits during childhood can affect youth for the rest of their lives through negative health outcomes (5). Chronic diseases related to childhood overweight status include coronary heart disease, type 2 diabetes, stroke, and some cancers. Overweight status in adulthood correlates strongly with overweight status during childhood (4). In response to the obesity epidemic in America, a wealth of obesity prevention programs have been created and implemented (6, 7, 8). Many of these programs have focused on schools to reduce the negative impact of obesity on children's health and to reduce their chances of being overweight or obese later in life (7, 8). Schools have been chosen because approximately 97% of youth in the United States attend school (9), on days they attend school students consume approximately 35% of their daily caloric intake at school (10), and schools have the resources to deliver programs for youth (8). A primary concern for children of this age group is that they do not consume the recommended amount of fruits and vegetables (3.5 cups for girls, 4 cups for boys ages 9-13 years); thus increasing fruit and vegetable (FV) consumption has become a public

health priority (5, 11). Low-income, minority youth living in urban communities have lower levels of fruit and vegetable consumption than other youth their age (12). A cross-sectional study found that as children's SES decreased, their obesity rates increased (13). This effect was more severe in minority populations. For these reasons inner city, low income and minority populations are a priority target for obesity prevention programs and programs to improve FV consumption (13).

Some obesity prevention programs have aimed to increase fruit and vegetable consumption (14-16). A meta-analysis of seven studies designed to increase FV intake in youth, aged 7 to 12 years with a total sample of 8,156 participants, found mixed effects on food preferences and minimal effects on FV intake (14). Interventions that were successful often used the Social Cognitive Theory (SCT) as their theoretical framework.

SCT has been applied to programs targeting FV consumption to focus their efforts and improve results. SCT suggests that environmental influences, person factors, and behaviors contribute to FV consumption in a systematic way (17). Garden-based nutrition education programs have been praised for their ability to affect all three (18). Traditional nutrition education only addresses knowledge, a person factor, without changing the environment or behaviors directly (17). As a result of SCT-based programs, children's preferences for FV have been improved, but results for consumption of fruits and vegetables have been mixed (19).

In models of SCT, the environment shapes person factors, which in turn influence behaviors (17). Environmental factors that influence FV consumption include the availability of FV, opportunities to model eating behaviors from others, and opportunities for nutrition education (20). Self-efficacy has been suggested as a person factor mediating the relationship between a person's environment and behaviors (17). Integrating self-efficacy and environmental

changes into a nutrition education program should give students the knowledge and empowerment to implement healthy behavior changes. Because there has been limited success with behavior change in interventions to change fruit and vegetable consumption in youth, interventions targeting other behaviors have been explored (14).

Positive youth development (PYD) programs provide an example of interventions that have been successful in creating positive behavior change in youth (21, 22). Traditionally, PYD programs have been used to address unsafe behaviors, such as drug and/or alcohol abuse or unsafe sex. SCT also has been applied to Positive youth development (PYD) programs. Students' normative beliefs about behavior have been proposed to be an important component of the classroom social environment related to the success of PYD programs (23). To achieve their effects, PYD interventions bring in community members to serve as role models, design community service projects, and hold classroom sessions (24, 25). While involving community members is an integral part of PYD interventions, research has shown that community member involvement can enhance the effect of an obesity prevention program as well (6). Through a youth development program, youth can identify the barriers that exist in their community for healthy eating and physical activity and work with community members to address them (26).

The Youth Can! Grow Healthy! (YCGH) study initially was designed to test a combined school garden and youth development curriculum against a school garden curriculum alone. As previous research has shown, preference for fruits and vegetables can be increased through school garden curricula. Additionally self-efficacy for FV consumption can be increased through personal and environmental factors (17). The initial environmental factors proposed to address self-efficacy in this study were the presence of positive adult role models to demonstrate and encourage healthy eating behaviors, the production of healthy foods to eat, and

improvements in the environment. The YCGH curriculum, the youth development portion of the project, taught children about healthy diets, physical activity, healthy community environments, and provided many opportunities to the increase the students' self-efficacy (See Appendix A). Further, the YCGH curriculum taught children how to assess their nutrition and physical activity environment using a Photovoice assignment, guided them in developing a plan to address their findings, and facilitated a report of their findings to key decision makers in their school and community.

The proposed research questions that were to be addressed by this study were: 1) Can a combined youth development and school garden intervention improve children's self-efficacy to consume fruits and vegetables more than a school garden intervention alone? and 2) Can a combined youth development and school garden intervention increase children's consumption of fruits and vegetables more than a school garden intervention alone? Secondary outcomes were self-efficacy to grow vegetables and school connectedness. It was hypothesized that the combined youth development and school garden intervention would have higher outcome measures of self-efficacy to consume FV, self-efficacy to garden, FV consumption, and school connectedness (See Appendix B for a variable table). The initial specific aims were to: 1) Increase fruit and vegetable consumption among participants, and 2) Increase self-efficacy for fruit and vegetable consumption among participants. Specific aims one and two were not measurable due to a low retention rate in the program. The research focus was modified with an added specific aim of conducting a formative evaluation of the program.

Literature Review

Interventions to Increase Fruit and Vegetable Consumption

In an effort to combat childhood obesity, many interventions have proposed that nutrition education would increase FV consumption among elementary-age children, but an analysis of seven studies found that these interventions have had only moderate effects on intake (14). Interventions have focused on knowledge or food preference change, but few have addressed availability and motivation together. A 14-month study completed in 2003 in the United Kingdom aimed at promoting healthy eating and physical activity behaviors, with the goal of reducing obesity, had some success in behavior change (27). There were four groups in the study: a nutrition education group, a physical activity promotion group, a combined nutrition and physical activity group, and a control group receiving no intervention. Nutrition knowledge scores were improved significantly ($p < 0.05$) in all groups. Surprisingly, the average weekly fruit intake was increased by 1.5 servings in the control group and increased by 0.7 servings in the nutrition education group ($p < 0.05$). Vegetable intake was increased overall, but there was not a significant increase in any of the groups targeted. The study did not have a significant effect on overweight or obesity among its participants. One explanation for the increase in fruit intake in the control group was that all four groups were implemented in each intervention school, which could have led to cross-contamination of students. Support for this explanation comes from the fact that all groups had a significant increase in nutrition knowledge.

Using SCT as a framework, the determinants of children's FV consumption were analyzed using survey measures of potential determinants and dietary recalls of 414 children. The determinants of FV consumption were categorized as environmental, personal, and behavioral factors (17). Environmental factors were FV availability, modeling of FV

consumption, and nutrition education. Personal factors were motivation and knowledge. Motivation was composed of food preference, self-efficacy, and outcome expectancies. The only behavioral factor identified was consumption. Significant effects ($p < 0.05$) were found for the variables of "availability on consumption," "motivation on consumption," and "motivation on knowledge" (path coefficients = 0.08, 0.10, and 0.05, respectively). Knowledge did not have the expected effect on consumption in the overall population, but was significantly associated with consumption in a female subsample (path coefficient = 0.24, $p < 0.05$). Because the data were taken at the same time, however, the causal direction of the relationship between knowledge and consumption could not be determined. Thus the authors suggested FV availability and motivation as potential targets for future nutrition interventions (17).

Many researchers are now using SCT to design interventions that integrate other factors in addition to nutrition education (17, 28-30). In the SCT model, six key factors influence health behaviors. These are: knowledge, perceived self-efficacy, outcome expectancies, goals, perceived facilitators, and impediments (31). Knowledge allows one to predict which behaviors would lead to the desired outcome. Perceived self-efficacy is one's own assessment of how well one would perform these behaviors under normal circumstances and when barriers arise. Self-efficacy is a key determinant because it has influence on the behavior itself and on the other determinant factors in SCT (31). Outcome expectancies are predictions of the result of one's behavior based on perceived self-efficacy and knowledge about the effects of the behavior. Outcome expectancies and perceived self-efficacy both influence goals set by the individual. High outcome expectancies and high perceived self-efficacy can lead one to set more ambitious goals (32).

The most effective way to build self-efficacy is through mastery experiences in which one performs the behavior and succeeds. Mastery experiences in which one overcomes obstacles can create a more resilient perceived self-efficacy (32). Other ways to build perceived self-efficacy are social modeling, social persuasion, and positive physical and emotional states (31, 32). Students have few opportunities to model healthy eating behaviors from their peers or teachers, as 80-90% of children and 93% of teachers do not eat the recommended amounts of fruits and vegetables (33, 34).

The Smart Bodies school wellness program was designed to increase preferences for FV and psychosocial correlates of FV consumption including self-efficacy among fourth and fifth graders (35). Five hundred and sixty students from 16 schools in Louisiana participated in the study. Schools were matched into pairs based on relevant factors and one from each pair was randomized into the intervention or control group. The three components of the intervention were: 1) a traveling exhibit which students visited as an "in-school fieldtrip" and learned about the digestion and absorption of food through hands-on activities; 2) the OrganWise Guys™, which taught children about the importance of good nutrition and the underlying physiology through characters representing bodily organs; and 3) health messages emphasizing the consumption of FV through school assemblies, dolls, classroom videos, games, books and lessons. Based on SCT, the study aimed to change the social environment of the participants and provide information about the health benefits of FV consumption. Using materials from the OrganWise Guys™, teachers modeled healthy eating behaviors and encouraged students to taste and consume FV. Surveys were administered before and immediately after the 12-week intervention. Results indicated that students in the intervention group had a greater increase in nutrition knowledge with an average increase of 0.66 points versus an increase of 0.21 points for

the control group on the nutrition knowledge questionnaire ($p = 0.00$) (35). Self-efficacy to consume fruit/fruit juice instead of dessert/cookies/candy and to consume the recommended number of FV also was significantly increased in the intervention group ($p = 0.00$). Preferences for some vegetables were decreased in fourth grade students in the intervention group ($p = 0.00$), but did not change in fifth graders. No explanation was given for this drop in preference.

A study done in 2005 in Alabama proposed a SCT-based nutrition education curriculum to improve children's nutrition knowledge, frequency of FV consumption, and dairy product consumption (29). The program was implemented with 702 children in the treatment group and 398 children in the control group. Lessons included standard nutrition education with the addition of leaders who taught skills necessary to choose healthy foods at school and at home and also accompanied students to the cafeteria to model healthy eating behaviors. The results indicated that the treatment group had a significantly higher score for frequency of FV consumption than the control group, with a gain of 0.31 points compared to -0.11 points in the control group ($p < 0.016$). Scores were calculated by subtracting the pre-assessment score from the post-assessment score.

In a 2002 study to determine potential mediators of FV consumption in 1,382 elementary students, Reynolds and colleagues did not establish self-efficacy as a mediator, but did find evidence that self-efficacy for FV consumption was positively related to FV consumption (28). They defined mediation as factors satisfying four criteria: 1) the intervention affects the desired outcome; 2) the intervention affects the proposed mediator; 3) the mediator must remain significant when the treatment group is controlled for; and 4) the effect mediated must be statistically significant. FV consumption was significantly increased between years one and two with an effect size of 0.42 and an effect size of 0.27 for the year one to year three differences.

The authors found that increases in self-efficacy were related to increases in FV consumption. Despite this relationship, the role of self-efficacy as a mediator was brought into question. Self-efficacy was not determined to be a mediator of FV consumption because although fruit and vegetable consumption was increased by the intervention, there were no significant changes in self-efficacy.

The California Power Plus Intervention was a randomized trial conducted in 26 elementary schools with a sample of over 1,800 students (16). This trial was based on SCT, and aimed to increase FV consumption of elementary school children by improving environmental factors, including: 1) opportunities to consume fruits and vegetables; 2) role models for FV consumption; and 3) social support for FV consumption. Working with food service personnel, the researchers aimed to increase fruit or vegetable servings at each intervention school by one serving each day. Food service personnel were encouraged to verbally support children in choosing fruits and vegetables while going through the school lunch line. Trained observers recorded students' dietary intake at lunch by watching students from a distance and recording the portion sizes of all items consumed. Results indicated that children in intervention schools had increased servings of fruits and vegetables even when potatoes and fruit juices were excluded from intake. The intervention group consumed 0.15 more servings than the control group during the final cafeteria observation, accounting for baseline level, grade, and gender ($p = 0.02$). Vegetable consumption was not significantly increased when analyzed independently of fruit consumption. Significant positive correlations were found between verbal encouragement of food service personnel and FV consumption and for FV availability on the school snack cart and FV consumption (16). This study was unique in that it used only environmental manipulations to

increase FV consumption of elementary school children and did not involve a classroom component.

Traditional interventions have had positive impacts on nutrition knowledge, fruit and vegetable consumption combined, and fruit consumption alone (16, 27, 29). Although the desired effects have not been achieved for vegetable consumption, availability of FV and motivation to consume FV have been identified as potential determinants of FV consumption (17, 28). Motivation to consume FV is composed of preferences, self-efficacy, and outcome expectancies(17). Garden-based nutrition education programs have been developed to increase motivation by targeting FV preferences and self-efficacy for fruit and vegetable consumption (17).

Garden-based nutrition education

School garden programs have gained popularity recently for use in academic instruction, as extracurricular activities, and to provide edible produce for the school meals program (36). Findings from previous garden-based nutrition education interventions have been mixed with some showing increased preference for FV and/or increased FV intake, while others have had no effect (37). Recent reviews of the limited number of garden-based nutrition education programs by Graham and Zidenberg-Cher in 2005 (36), Ozer in 2007 (18), and Robinson-Obrien and colleagues in 2009 (19) discussed the potential for school garden programs to improve children's academic achievement, motivation to learn, psychosocial development, behavioral engagement, and cooperation with peers. Ozer cited a need to have both subjective and objective sources of data to document the impacts of future garden-based nutrition education programs, including self-reported student surveys, interviews of all stakeholders, and observational data from teachers and program leaders (18). She recommended objective information from school

records, such as absences, grades, and behavioral discipline, to document the effects of school gardens (18). Students going to the same school could present less variation in responses due to existing connections, which could lead to artificially small P values. It was recommended that future interventions use control groups with a minimum of six schools per condition (12 schools total) to be able to control for this "clustering" of students within each school. She also recommended evaluating garden-based nutrition education and classroom-based nutrition education separately (19). Another recommendation in the literature is to use a standardized table format to report key information about school garden interventions and how students were exposed to them (38).

A study by Lineberger and Zajicek in 1998 evaluated the effects of an in-class garden-based nutrition education curriculum on students' FV preference and FV intake (39). One-hundred eleven students from five elementary schools were taught using this curriculum and received instruction on each of 10 units over the course of one year, with no control group. Teachers were required to present material from each of the 10 units to their class to be eligible to participate in the study, but no information on the number or length of lessons was reported. Some of the lessons required hands-on gardening activities in the classroom or in an outdoor vegetable garden. The FV preference measures had a potential range of 0 to 2. Vegetable preference was found to increase after the lessons, from a pretest score of 0.98 to a posttest score of 1.05 ($p = 0.03$). Greater increases were found in students with the lowest initial vegetable preferences. Fruit preference scores were high during the pretest measurement and did not improve over the course of the study. The snack preference results had a potential range of 0 to 1. Snack preference for fruits and vegetables over non-fruit or vegetable snack options increased after the lessons, with students more likely to choose a fruit or vegetable snack over other

choices after the lessons (0.40 pretest and 0.46 posttest, $p < 0.01$). No differences were found in behavioral measures of FV consumption. The authors suggested that a program with a more robust intervention including a behavioral change component to address FV consumption would be more likely to achieve these behavioral effects.

Of the two studies conducted so far to assess the effect of garden-based nutrition education on self-efficacy to consume FV, results have been mixed. A third two-year study on a school garden intervention measuring self-efficacy involving eight school locations is currently underway(40). Poston and colleagues studied self-efficacy to garden and to consume FV after implementing a garden-based nutrition education curriculum (37). They compared an eight-lesson gardening curriculum from the Junior Master Gardener program to five lessons from a traditional nutrition education program, Professor Popcorn. The discrepancy of having eight gardening lessons versus five nutrition education lessons was not discussed, nor was there a contact control for the three extra gardening lessons. Over two rounds of education, a total of 18 students in grades three to five were taught using the Junior Master Gardening curriculum and 11 were taught using the Professor Popcorn curriculum. Nutrition knowledge, FV preference, and self-efficacy for both gardening and for eating fruits and vegetables were assessed at baseline and at the end of the study. The results of the assessments indicated that there were no differences between or within groups for nutrition knowledge. There were no differences in FV preference when measured between or within groups at the beginning or end of the program, although there was a significantly higher mean preference for fruit over vegetables in both groups at baseline and at the end of the program. No statistical analysis of fruit preference was reported. Gardening self-efficacy was not affected in the Professor Popcorn curriculum, while in the gardening program self-efficacy to garden seemed to depend on the season. In the summer

trial, self-efficacy to garden significantly increased from 6.0 to 7.86 ($p < 0.10$), while in the fall trial, self-efficacy was found to decrease significantly from 8.64 to 7.0 ($p < 0.10$) suggesting self-efficacy to garden may be subject to seasonal variation. No significance was reported on the measure of self-efficacy for FV consumption (37).

A study by O'Brien and Shoemaker found no between- or within-group differences in self-efficacy to consume fruits and vegetables among control and experimental groups after a 10-week garden-based nutrition education program (41). The experimental group, which had 17 students, received eight lessons from the Junior Master Gardener curriculum, while the control group, which had 21 students, received no education. This study measured nutrition knowledge, FV preference, self-efficacy for both gardening and FV consumption, and outcome expectancies for gardening and FV consumption. There were no significant differences in nutrition knowledge between the two groups at baseline or between the baseline and outcome measurements. Fruit preferences were high at baseline and did not change over the course of the program in either group. Slight increases in vegetable preferences were found in both groups, but they were not significant. In their discussion of these findings, the authors questioned if the length of their study, 10 weeks, was enough to change FV preferences or self-efficacy to consume FV. Gardening self-efficacy was unchanged in the experimental group, while the control group's self-efficacy to garden increased from 6.95 to 8.43 ($p = 0.03$). Outcome expectancies for gardening showed a similar pattern to self-efficacy to garden, with the control group's outcome expectancies increasing over the program while the experimental group maintained a high level. Seasonal variation was suggested as a mediator for the increase in the control group's self-efficacy to garden. Increased self-efficacy to garden then could have led to higher outcome expectancies for gardening, as explained by SCT (31). Because the program ran

from spring to summer, children may have spent more time outside and could have participated in gardening outside of the school environment, leading to increased self-efficacy to garden. Outcome expectancies for fruit and vegetable consumption were unchanged in the control group and significantly decreased in the experimental group, which the authors suggest may have been the result of the ripeness of fruits served at two sessions of the experimental group (41).

A study by McAleese and Rankin found increased FV intake among sixth graders after a garden-based nutrition education program (15). Students from three elementary schools participated in the study: a control group of 25 students with no intervention and two experimental groups: a group of 25 students with a 12-week in-class nutrition education program (group one), and a group of 45 students with a 12-week in-class nutrition education program plus hands on outdoor gardening experience (group two). FV consumption was evaluated by having students complete three 24-hour food records at pre- and post-intervention. Results indicated that group two had significant increases in daily FV intake compared to both group one and the control group. FV servings/day for group two increased from 1.93 to 4.50 ($p < 0.01$) servings/day over the course of the study. Neither the control group nor group one had significant increases in fruit or vegetable servings (15).

Morris and Zidenberg-Cherr conducted a one-year study of a nutrition education curriculum with a garden-based activity for each lesson (42). Fourth graders from three schools participated in the study with two schools serving as experimental groups and one serving as a control. The first consisted of 61 students serving as a control (CO) with no nutrition education or gardening activities; the second consisted of 71 students receiving only the classroom-based nutrition education lessons (NL); and the third group consisted of 81 students receiving both the in-class nutrition education and the garden-based activities (NG). Nutrition knowledge and FV

preference were assessed before the course, immediately after completion of the course, and six months after completion. Nutrition knowledge was found to be higher in both the NL and NG groups at posttest with scores of 20.5 +/- 0.4 and 20.8 +/- 0.4, respectively, while the CO group scored significantly lower in nutrition knowledge with a score of 17.1 +/- 0.4 ($p < 0.01$). Nutrition knowledge scores were analyzed using analysis of covariance with the pretest score as a covariate, the group as a fixed factor, and the posttest score as the dependent variable. Vegetable preference was measured individually for six vegetables, and the results were analyzed for each. Preference scores were calculated by comparing the groups' posttest scores while using the pretest scores as a covariate. Preferences for carrots and broccoli were found to increase from pre- to posttest in both NL (4.7 and 3.8, respectively $p < 0.05$) and NG (4.7 and 3.8, respectively, $p < 0.05$) groups compared to the CO group. Preferences for snow peas and zucchini increased in the NG group (4.7 and 3.8 respectively $p < 0.05$) compared to NL and CO groups. At six months follow up, the NL group no longer had significantly higher preference for broccoli, while the NG group no longer had significantly increased preference for carrots, but significant increases in preference for broccoli, snow peas, and zucchini were maintained (42).

A one year garden-based education program of 320 sixth grade students found increased consumption of, preferences for, and ability to identify FV (38). Two intervention groups received garden-based nutrition education, while one control group had a classroom-based nutrition education curriculum. The intervention was delivered once per week for one hour over four months for a total dose of 13 hours of intervention. Sessions were integrated into the school science curriculum and were held during regular class time. In addition to the regularly scheduled lessons, the intervention included two community events: one in which students served salad made with ingredients grown in the garden during the school's lunch period, and

another in which participants invited family, friends, and school personnel to a Saturday work party at the garden. At posttest, students reported having tried a greater variety of vegetables than the control group (mean change in score, +.06 ± 1.4 in intervention, -0.03 ± 1.2 in control, p = 0.002), but a taste test showed no difference between the intervention and control groups' willingness to try new vegetables (38). The mean change in scores on the Garden Vegetables Frequency Questionnaire showed that students in the intervention groups consumed a greater variety of vegetables (0.5 ± 2.1 p = 0.010) at school than students in the control group (-0.3 ± 1.7 p = 0.010), and had increased preferences for vegetables (0.7 ± 0.3) compared to the control group (-0.2 ± 0.3) (p = 0.029)(38).

A recent survey of California school teachers on their attitudes about school gardens found that 43% of them thought that the gardens were somewhat to very effective at enhancing healthful eating habits among participants (36). Teachers in the same survey expressed a need for resources to help them integrate academic subject areas into the garden curriculum. These results documented that teachers find school gardens to be effective and that there is a need for school garden curricula built on the school curriculum goals.

Based on SCT, school garden interventions have been developed to increase two determinants of FV consumption: motivation to consume FV and availability of FV (17, 19). Although results have been mixed, some studies have documented the potential for school garden programs to improve FV consumption and FV preferences (15, 17, 39, 42). School garden curricula are still in development, but successful interventions provide evidence-based recommendations for future programs (15, 38, 39, 42).

Youth Development Interventions

An important aspect of the PYD strategy is giving children access to an adult to serve as role model or mentor. Since the "No Child Left Behind" act was implemented, teachers and principals in schools have had increased pressure for students' academic achievement and less time for informal mentoring roles (21). By partnering with other community agencies to bring responsible adults into schools, the community can participate in creating an environment that fosters the growth of young people in all areas necessary for successful development, not just academics (21).

Traditional PYD programs have been effective in smoking cessation and reduction of drug and/or alcohol use, but PYD strategies used in these interventions have not been applied to any reported nutrition interventions for youth (22). To be considered a successful youth development program, at least three of these five components must be addressed: 1) competence; 2) confidence; 3) connections; 4) character; and 5) caring and compassion (22). According to Roth, programs that do not meet at least three of these developmental criteria do not qualify as youth development programs, because they would not encourage participants to develop necessary competencies and give them the self-efficacy to execute them (22). Child normative beliefs about behavior have been proposed as a mediator of a PYD intervention's success (23). In an SCT-based model of the classroom setting, individual students' beliefs about acceptable and unacceptable behaviors are proposed to influence the classroom social environment, which is a determinant of the success of an intervention (23).

School connectedness is a subset of the connections component of youth development mentioned by Roth (22). School connectedness includes the following components: 1) a sense of belonging to school; 2) liking school; 3) feeling that teachers are supportive and caring; 4)

having friends at school; 5) being engaged academically; 6) perceiving that discipline is fair and effective; and 7) participation in extracurricular activities (44). School connectedness has been suggested as a protective factor for many risk behaviors, and is negatively associated with behaviors, such as substance abuse, violence, and pregnancy (44, 45). A study of 7,290 elementary students found those involved in a program to increase school connectedness had better academic performance, more extracurricular involvement, fewer reports of misconduct at school, and higher levels of reported school connectedness (46).

A majority of youth development programs aim to reduce target risky behaviors, such as drug use and sexual behavior, by encouraging positive development in other areas (22). The Positive Youth Development Collaborative (PYDC) was an afterschool program based on PYD principles (24). The intervention entailed 18 lessons taught by community members who were trained to deliver the curriculum by the research team. The curriculum involved classroom sessions as well as field trips to community organizations and time spent with adult mentors. The aim of the PYDC was to prevent substance use among its participants. Attitudes about drugs and drug use and reported drug use were the outcome measures. Perceived risk of harm from drug use was increased in the intervention group, which had a 0.8 point increase in average score compared to a 0.1 increase in the control group ($p = .006$). There were no significant differences in drug beliefs (doing x drug is wrong) between groups. Reported alcohol use was 63% lower in the intervention group than the control group from pretest to one-year follow up ($p < 0.029$). There was no difference in marijuana use between groups at the end of the program (six months), but at one-year follow-up the odds ratio for marijuana use in the past thirty days was 0.18 ($p < 0.001$) for the intervention group versus the control group (24).

The Chicano-Latino Youth Leadership Institute (ChiYLI), a program based in Minnesota, aims to "encourage, empower, and develop leadership skills and qualities in Chicano-Latino youth" (25). Chicano-Latino youth were chosen as the target for this institute because these youth were found to feel less safe at school, be less involved in school activities, and report more high risk behaviors, such as alcohol and tobacco use and sexual intercourse, when compared to their non-Hispanic white classmates. The protective factors identified for ChiYLI to target were developing leadership qualities, engaging youth in designing and performing community service projects, and providing them with adult and peer role models from their own culture who could model healthy behaviors. To improve these protective factors ChiYLI conducted an annual leadership institute, assisted youth in planning and implementing community service projects, and provided opportunities to visit college campuses and learn how to prepare for postsecondary education. Participants completed surveys immediately before and after the annual leadership institute and one year after the institute. Results showed significant ($p < 0.01$) increases in self-confidence, leadership skills, and a higher rate of graduation from high school among CHiYLI participants (25).

One potential outlet for youth development is to address environmental barriers to healthy eating and/or physical activity (26). In this way students' competence and confidence to advocate for their environment can be increased while making positive changes that can affect the health of themselves and their community. By addressing the community's food and physical activity environments, youth development programs can change environmental determinants of FV consumption and/or physical activity. Thus, PYD programs can potentially have an obesity prevention focus.

Youth development programs have proved to be successful in reducing problem behaviors and increasing positive outcomes such as graduation rates (24, 25). Despite success in these areas, no youth development programs could be identified that specifically targeted nutrition- or obesity-related behaviors. Youth development principles could augment nutrition and obesity prevention programs by enabling students to improve their food and/or physical activity environments.

Formative Evaluation

A large multi-site intervention with the aim of increasing adolescent fruit and vegetable intake over two years failed to meet its goals (47). The intervention was based on SCT and involved classroom, school-wide and family components. Results showed some improvement at the mid-point evaluation, but no significant differences remained between control and intervention groups at year two (47). To better inform future trials, the authors recommended the use of formative evaluation during intervention trials with adolescents. Also, they suggested collecting information about each of the components and lessons in the trial by asking students what they thought of them (47).

Formative evaluation any process by which qualitative and/or quantitative data are collected from multiple stakeholders before an intervention is implemented to ensure it is designed and delivered in an appropriate and effective way (48). Siegel and Lotenberg outline the three main uses of formative research: 1) learning the practices, needs, wants and values of the target audience related to the desired health behaviors and competing behaviors; 2) identifying what services or benefits can be offered to the population and how can these services or benefits be made available; and 3) developing and testing a method for delivering the intervention (49). In learning about the target population, researchers should answer questions

about what may be expected of participants, where in the process people disengage from programs, and what keeps them from engaging in the first place (49). In identifying what type of intervention is most appropriate, researchers should identify the most relevant and appropriate benefits, determine the appropriate approach to conveying these benefits, and frame the image of the program to suit the target audience (49). Finally, a pilot test can provide feedback on the program from stakeholders including, in the case of school-based programs, students, faculty, program staff, and the community (49). An expanded description of formative research details two additional uses of formative research: 1) evaluating whether or not the program achieved its goals and 2) how the program's results are presented and accepted in the public and scientific communities (48). In evaluating the program's success, it is recommended that both process and outcome measures are compared to goals. Depending on the time and resources available, formative evaluations can range in scope from simply asking questions of program participants to multi-site pilot interventions with qualitative and quantitative data from multiple stakeholder groups (48, 49).

In a school-based obesity prevention trial for Native American children, formative evaluation helped the authors learn the teachers' interest in physical education and the activity and students' food preferences (43). This evaluation was used to develop an intervention that was delivered in schools that were located in the communities of six different Native American nations. The methods used included direct observations in the community and school, in depth interviews with school officials and food service personnel, interviews with pairs of children, focus groups with child caregivers, observation of children's purchase and consumption of food in local stores, and follow-up interviews with parents, teachers, and community members. This formative evaluation identified behaviors of students that increased their risk of weight gain (ex.

sweetened beverage intake, little family role modeling for physical activity) and provided information on the food preferences of children. The authors found that interviewing children in pairs helped alleviate the shyness encountered when interviewing children alone and limited behavioral problems found in child focus groups. Other pertinent types of information were the existing health education curriculum, the processes for modifying curriculum in each school, and types of classroom activities that students enjoyed. (43). Researchers noted that the information gathered helped them make implementation of the initial phase of the intervention more successful.

Webber and associates conducted a formative evaluation to develop a worksite wellness program for elementary school personnel (50). This evaluation involved focus groups, school surveys, environmental audits, and a pilot study. These varied methods of data collection provided researchers with rich data from which to work. Focus groups provided qualitative data from the school staff's perspective on personal experiences, social environment, physical environment at home, physical environment at school, and program receptivity. The school surveys delivered to principals provided quantitative data about each school's personnel, class structure, facilities, afterschool programs, transportation, communication among personnel, school policies, and the school food environment. Environmental audits were completed by research staff and assessed the food and physical activity environments in the schools and their surrounding communities. The pilot study provided information on the logistics of delivering the intervention and how to collect survey information most efficiently from participants. Thus, this study had four sources of information (focus groups, surveys, audits, pilot) from three different populations (school staff, principals, and researchers), allowing them to define themes from different methods to improve the external validity of their data. The researchers pilot tested

intervention materials for the second year of the intervention during the first year of intervention to tailor them to participants (50).

Bellows and associates used key informant interviews and focus groups to conduct a formative evaluation of a social marketing campaign (51). Key informant interviews were conducted with teachers who had participated in the target intervention the previous year. Focus groups were conducted with the parents of potential participants in the program. Key informant interviews focused on the current practices, barriers, their ideal program, and training related to physical activity. Focus groups brought out information on the parents' perspective on preschoolers' favorite activities, what led children to be physically active or not, ideas to encourage physical activity, the physical activity level of parents, what would help parents be more active, and potential names for the pilot that would appeal to children. Having two sources of data allowed this formative evaluation to compare and draw out themes. Further, two data sources provided a more comprehensive view of the study than if it had relied on only one population for all of its data (51).

Wilson and colleagues conducted a formative evaluation of a pilot program to increase physical activity in underserved adolescents (52). They based their formative evaluation on a summary of process measures of the program provided by program staff. The process measures included quantitative measures of the dose of the intervention and fidelity to the constructs of the curriculum. Open-ended questions were asked of the staff at the end of the pilot to expand on information gathered through quantitative measures. Responses from program staff were reviewed to discover strengths of the program as well as issues that needed to be addressed in the design of the trial. Some common themes included the cognitive appropriateness of activities, need for interactive activities, balance of discipline and nurturing, and importance of team

building (52). For this type of formative evaluation, data can be collected at each session by program staff and analyzed after the pilot by all staff. Using this method requires fewer resources and is less intrusive into the program than those involving focus groups or interviews with participants (48). Although this method does not allow corroboration between different stakeholder groups, the researchers were able to find common comments from staff working at different locations.

Summary

One possible reason for lack of effectiveness of school-based and afterschool programs to increase FV consumption, as viewed through the SCT, is that the youth do not have the self-efficacy to establish new dietary patterns that go against social norms. This was demonstrated in quasi-experimental studies by Reynolds and others, in which self-efficacy to consume FV was not significantly increased (18, 28). Combined youth development and school garden programs could increase children's self-efficacy through the environmental contexts of a new peer group, adult leaders serving as healthy behavior role models, physical activity in the garden, eating fresh fruits and vegetables from the garden, and improving the food and/or physical activity environment of the community (18).

Combined youth development and school garden programs can foster new peer groups and develop self-efficacy for healthy behaviors. There are limited opportunities for students to observe and model healthy eating behaviors at school (33), (34). Through contact with positive adult role models, work in the garden, and youth development strategies, healthy behaviors can become highly reinforced and may become the social norm of the group. Self-efficacy for FV consumption and other healthy behaviors thus can be increased initially through modeling by the leaders and then progressively through students being able to model one another's behavior (53).

The project described in this thesis, Youth Can! Grow Healthy!, aimed to design, implement, and evaluate a combined garden-based nutrition education and youth development curriculum and compare it to a garden-based nutrition education curriculum. A curriculum designed to meet learning standards of fourth and fifth grades in the Knox County School System augmented classroom learning objectives in the school garden environment. It was proposed that self-efficacy for FV consumption would be established through engaging the youth in a PYD program and increasing the availability of fruits and vegetables.

This program was not successful in collecting sufficient data to answer the research questions. Due to attrition, follow-up data at the intervention and comparison schools was insufficient. Therefore, changes in fruit and vegetable consumption or self-efficacy to consume fruits and vegetables could not be determined. To better understand this attrition, this thesis presents the results of a formative evaluation of YCGH, which provides lessons learned to researchers and practitioners working with adolescents in an afterschool setting

Chapter II Manuscript:

Formative evaluation of a combined youth development and garden-based nutrition education afterschool program

Introduction

Obesity rates in children aged 6-19 years have tripled between the years of 1980-2002 (1). Since 2002, this rate has remained stable, with about 35% of children in this age range at or above the 85th percentile of age- and gender-specific body mass index (BMI) (2). The high prevalence of childhood obesity has become a public health priority because of the negative social- and health-related outcomes (3-6).

In response to this epidemic, interventions have been created and implemented to prevent obesity among children. Fruit and vegetable (FV) intake and physical activity are primary goals for obesity prevention programs (7). Social Cognitive Theory (SCT) provides a theoretical base for designing effective interventions to improve health behaviors, such as FV consumption (8).

SCT has been used to guide FV consumption intervention designs by addressing individual and environmental factors hypothesized to affect behavior (9-11). Two reviews of school- and SCT-based studies with the aim of increasing FV consumption in children found mixed, but promising results (12, 13). French and associates analyzed four SCT-based studies that aimed to increase FV consumption in children and found that three of the four showed increased FV consumption post-intervention (13). Howerton and associates conducted a meta-analysis of seven SCT-based interventions in children and found that six of the seven studies increased FV consumption (12). Finally, an afterschool, SCT-based study found that although only nutrition knowledge increased significantly, positive effects were found for food

preferences, self-efficacy, and intentions to choose healthful food options (14). Thus, SCT is a promising theoretical base for designing effective afterschool interventions to increase FV consumption in youth.

Further, SCT has been used to develop garden-based nutrition education programs for children that aim to increase FV preferences, self-efficacy to consume FV, and FV intake (15). Although promising, the results of these programs are mixed as well. Programs lasting 10 weeks or less have had limited success (16, 17). Programs ranging in length from 12 weeks to one year have produced better results, with improvements in FV preferences and FV intake (18-20). While successful interventions provide some evidence for garden-based nutrition education, curricula for garden-based nutrition education programs targeting FV consumption are still in development (19).

Youth development programs focus on positive development, thereby creating an empowering environment where youth are allowed to make decisions and guide the program, and providing opportunities for youth to develop interests, build skills, and be recognized for their work by school and community members (21, 22). These programs have been used successfully for smoking cessation and reduction of drug and alcohol use, but no reported youth development programs have targeted nutrition behaviors and/or physical activity (21-23). The success of youth development programs in changing youths' behaviors provides an example that could be used to inform interventions to improve FV consumption (22, 23).

Formative evaluation of health-related programs has helped researchers tailor interventions so that interventions incorporate important factors, such as the age, culture, and

local environment, of their target audiences (24-27). Formative evaluation provides feedback to researchers that can be used for future large scale interventions on how to engage participants in programs, what causes participants to leave programs, and how to attract and retain participants for future interventions (28). Formative evaluation helps identify intervention strategies that are best suited for the target audience (29). A variety of methods can be used for formative evaluation depending on the resources available (29). The extent of what a formative evaluation incorporates can range from conducting a pilot program using multiple sites to asking questions of the target audience before delivering a lesson (30). One method of formative evaluation that requires minimal time and resources is to have program staff complete evaluation forms after each session of a pilot intervention (27). In the literature, there is a missing connection between formative results and their application to larger trials (30). The purpose of this study was to conduct a formative evaluation of a novel, individual-interpersonal level, SCT-based afterschool program that combined youth development and garden-based nutrition education curricula to promote physical activity and FV consumption. This paper presents a formative evaluation of this pilot study, in which this novel approach was implemented, with suggestions for improvements of intervention design, delivery, and program management for future studies.

Methods

Pilot Study Description

Fourth and fifth grade students (aged 9-11 years) were recruited at two urban elementary schools. One school received the novel, SCT-based, afterschool program, while the other school served as a control comparison. This formative evaluation will present data only from the school receiving the novel, SCT-based, afterschool program. This school represented an underserved

population, with 96% of students meeting eligibility criteria for free or reduced lunch (31). Child assent and parental informed consent were obtained from students and their parents (respectively) before their participation in this study. This study was approved by The University of Tennessee (UT) Institutional Review Board (IRB) and the Knox County School compliance officer.

The program was implemented over 16 weeks, meeting twice per week for one hour directly after school. Parents provided demographic information along with consent. Baseline anthropometric and demographic characteristics of participants are displayed in Table 1. Surveys were completed by participants during the first three group sessions and the two sessions prior to the final session (See Appendix C). Height and weight measurements were taken by the principal investigator (PI) and co-principal investigator (Co-PI) over the same periods as survey measures. Participants received one day of garden-based nutrition education activities per week and one day of youth development activities per week. The PI was present for all sessions and led sessions with the help of the Co-PI and community partners.

The garden-based nutrition education curriculum was based on the Junior Master Gardener series (33). The youth development curriculum, entitled Youth Can! Grow Healthy! (YCGH), was an adapted version of the Youth Can! Improve their Diet for a Healthy Heart curriculum. Photovoice was integrated into the youth development curriculum as a way to engage participants in researching their community and advocating for change to promote physical activity and FV intake. The SHOWED method was used to guide discussions of participants' perspective on the photographs they took during Photovoice. See appendix D for a

Table 1
Baseline anthropometric and demographic characteristics of participants, 2010

Characteristics	Intervention
Sample Size	13
Race/Ethnicity	
Black	2
White	11
Ethnicity	
Hispanic	3
Non-Hispanic	10
Sex	
Male	5
Female	8
Mean Height (in)	57.89 ± 4.47
Mean Weight (lb)	121.5 ± 35.07
Percent at or Above the 85th Percentile BMI-for-Age	82%

Note. Values expressed as ± are standard deviations.

list of the probing questions used with this method. Appendix E contains a summary of the lessons for both the garden-based nutrition education and youth development curricula.

Formative Evaluation

Formative evaluation of the pilot program was conducted using session evaluation forms completed by the PI. An existing tool for documenting and evaluating afterschool programs was used with permission from Beardsley Community Farm, an urban demonstration farm (Appendix F). Information collected at each session included the name and associated organization of the session leader, the number of volunteers, the number of participants in attendance (as recorded at the start of each session), and a summary of the activities implemented, including what was effective and ineffective about each activity, and how the session outcomes were evaluated. Effective activities were judged to be those in which participants readily participated, were able to complete the activity in the allotted time, and required little or no disciplinary action from activity leaders. Ineffective activities were those in which participants failed to engage in the activities, were unable to complete the activities in the allotted time, or required a great deal of disciplinary action from activity leaders. Field notes and qualitative reflections on why each session was effective or ineffective were listed on the back of each evaluation form. The PI completed an evaluation form after each session.

Formative evaluation forms were analyzed as follows. At the end of each session, the effectiveness of each activity was judged by the PI based on the criteria listed above. This feedback on each activity's effectiveness was used to tailor the lessons to participants during the pilot intervention. At the end of the pilot, evaluations of the youth development and garden-based nutrition education curricula were entered into a spreadsheet as effective or ineffective

components of each curriculum. These evaluations then were condensed to form summary statements about each activity's effectiveness. These summary statements were placed on new overall lists, one of effective and one of ineffective activities, with activities from both curricula combined on each list. This created two summarized lists that were inspected for themes by the PI. These lists were examined for common participant behaviors or lesson components related to the level of the lesson's effectiveness. The three themes that emerged were successful strategies for engaging participants, issues within the social environment, and program management strategies. Modifications made to the delivery of the curricula during this program also were taken into account. Trends in attendance data were analyzed with respect to recruitment strategies, conflict with other afterschool programs, family mobility, and behavioral issues.

Results

Theme: Successful Methods for Engaging Youth

Creative Activities

Activities that allowed participants to express themselves creatively were more successful in engaging participants than traditional didactic methods, such as when an adult delivered a lesson through lectures accompanied by handouts. Strategies that allowed creative expression included writing, drawing, taking photographs, acting, and singing. For example, when creating ground rules for classroom and outdoor behavior, participants were asked to suggest potential rules that were recorded by the PI. Then, participants chose a rule from the list and created a sign that could demonstrate this rule to others. This activity gave participants ownership of the rules that they selected. Subsequently, participants were observed enforcing their rules when other participants' behaviors contradicted them. Another example of a creative activity came

from a plant nutrients lesson. After reviewing the nutrients important to plant growth and development, participants stood in front of the group and acted how a plant would behave with an excess or deficiency of a selected nutrient. Creative activities were integrated into the curriculum whenever possible to give participants the opportunity to express themselves.

Missions

Giving participants fact-finding "missions" engaged them in finding information that supported program goals (34). This method initially was used when participants identified community leaders to invite to a meeting by searching in phone books and on the Internet. Participants were excited about finding basic information, such as addresses or phone numbers, and recording them for later use. Participants also were given "missions" for lessons on plant seasonality and nutrition label reading. These "missions" often were phrased as "detective work," which resonated well with participants.

Working in Pairs

Working in pairs was a built-in component of some activities, such as Photovoice. During Photovoice assessment sessions, participants worked in pairs, with one participant taking photographs and the other recording the subject of the photograph and its significance. The success of this strategy led to its use in other parts of the curriculum. Projects in which participants were asked to work alone often took more time than allotted. Therefore, individual projects were combined into pairs or groups. For example, creating a poster collage took much longer than anticipated, but when new participants joined the program they paired up with existing participants, which facilitated completing the collages in a timely manner.

Experiential Activities

Providing experiential examples of concepts from lessons greatly increased participant interest in lessons. In a lesson on plant parts, participants first reviewed the basic edible parts, and then real food examples of these parts were displayed for participants to identify. In a lesson on bug mouth parts, participants were given real foods and directed to consume them like a bug would, mimicking the mouth parts of bugs, such as a pair of pincers or a proboscis. Participants also enjoyed lessons in which they were allowed to go outside and plant, weed, water, or do other activities in the garden. These types of activities engaged the entire group in lessons and limited behavioral problems.

Cognitive Appropriateness

The analysis and planning components of Photovoice were challenging to participants. The process of developing themes and a plan for improvement was adapted to the cognitive level of the participants in two main ways. First, during analysis of the photographs, questions were asked in context of things that made it easy or hard for kids to grow up healthy, focusing on the nutrition and physical activity environments (See Appendix D for a full list of questions and probes). Questions about causation, such as "Why does this situation exist?" were tested, but participants did not understand them, so these questions were dropped. Secondly, during the prioritizing and planning phase of Photovoice, participants had difficulty prioritizing themes to develop a plan. Therefore, participants were asked to set deadlines for each important issue to be resolved, which helped make the activity more cognitively appropriate for participants.

Theme: Social Environment Issues

Behavioral Problems

Behavioral issues included off topic conversations, teasing, and difficulty focusing on lessons. Progress was slow on lessons that were not planned or adapted using the successful methods mentioned above. Despite reiteration of the ground rules to all new participants, those who joined the group after the initial team building sessions exhibited more behavioral issues than those who attended sessions from the beginning. Allowing long periods (30 minutes or more) for participants to work on creative projects or other unstructured activities led to increased teasing and off-topic conversations and activities. Teachers were brought into garden club sessions several times to re-affirm classroom rules and standards for behavior. Although this temporarily resolved the issues, it was not consistent with the youth development approach, because it deviated from expectations for behavior developed by participants during the initial team building sessions and did not allow the youth to address the behaviors inconsistent with their ground rules.

Shyness

During the initial Photovoice sessions, participants described their photographs and provided rich perspectives on them. Some participants were reluctant to share in small groups and had to be encouraged to give their opinions on the photographs they took. Participants developed a presentation for community leaders so they could share their photographs and plan for improving the community, but were reluctant to speak during the actual meeting. One participant did the majority of the presentation, while the PI facilitated discussion of other participants' findings.

Gender Subgroups

While preparing the materials for indoor growing, participants divided into self-selected subgroups. The two tasks to be completed were filling pots with soil and making signs to establish rules for protecting the seedlings. Although none of the participants reported prior gardening experience, the male participants gravitated toward the job of filling the pots, while females were excited to design and create the signs. This session established separate gender subgroups within the program that persisted in other activities, such as Photovoice, poster making, and games as described below.

Competition

Several lessons developed into competitive games. When participants were asked to identify photographs as either organic or conventional farming methods, natural groups formed between genders. This led to a lively competition to be the first group to identify correctly the photographs. Other competitions included trying to be the first to complete a poster collage or find all of the objects during a scavenger hunt. Competition increased participation in activities and limited behavioral problems.

Theme: Program Management Issues

Attendance

Thirteen participants provided consent/assent and were enrolled in the study and nine students attended group sessions but were not enrolled in the study. Attendance data are reported here for participants who provided consent and assent and were enrolled in the study. Average attendance of enrolled participants was 5, or approximately 38%. The highest attendance was 11 and the lowest was 2 participants. The mode of attendance was 3. Retention at the final session

of the pilot was 23%. Figure 1 depicts the trends in attendance of enrolled participants and non-enrolled attendees from January to May. When attendance dropped to 3 participants, phone calls were made to parents of those who were absent to encourage them to attend the next session. Attendance rose to 6 participants at the next session.

To maintain engagement and facilitate the completion of group activities, students were allowed to join the group and participate in activities on an open basis. Nine students joined the program after initial data collection and were not enrolled in the pilot. These students provided parental consent to attend and participate in group sessions but were not a part of data analysis. Some of these students were recruited through initial participants. For example, a group of participants saw a friend during the community assessment using Photovoice. Subsequently, this student later joined the program and attended regularly. Another participant began gardening at home with materials received during a garden-based nutrition education session. Shortly after she began this project, several friends from the participant's neighborhood began attending YCGH sessions after helping her work in the garden at home.

Despite rolling recruitment, there were several reasons for the high dropout rate for participants enrolled in YCGH. Some participants were absent because they attended other concurrent afterschool activities. English as a second language classes and state standardized test tutoring took priority over YCGH and required several participants to stop attending YCGH sessions in March. An afterschool day care program also drew participants away. After the first week of the program, adjustments were made to account for another afterschool club that met on the same day. Two participants moved during the course of the program and had to make new arrangements for transportation. Survey administration (discussed below) could have set a

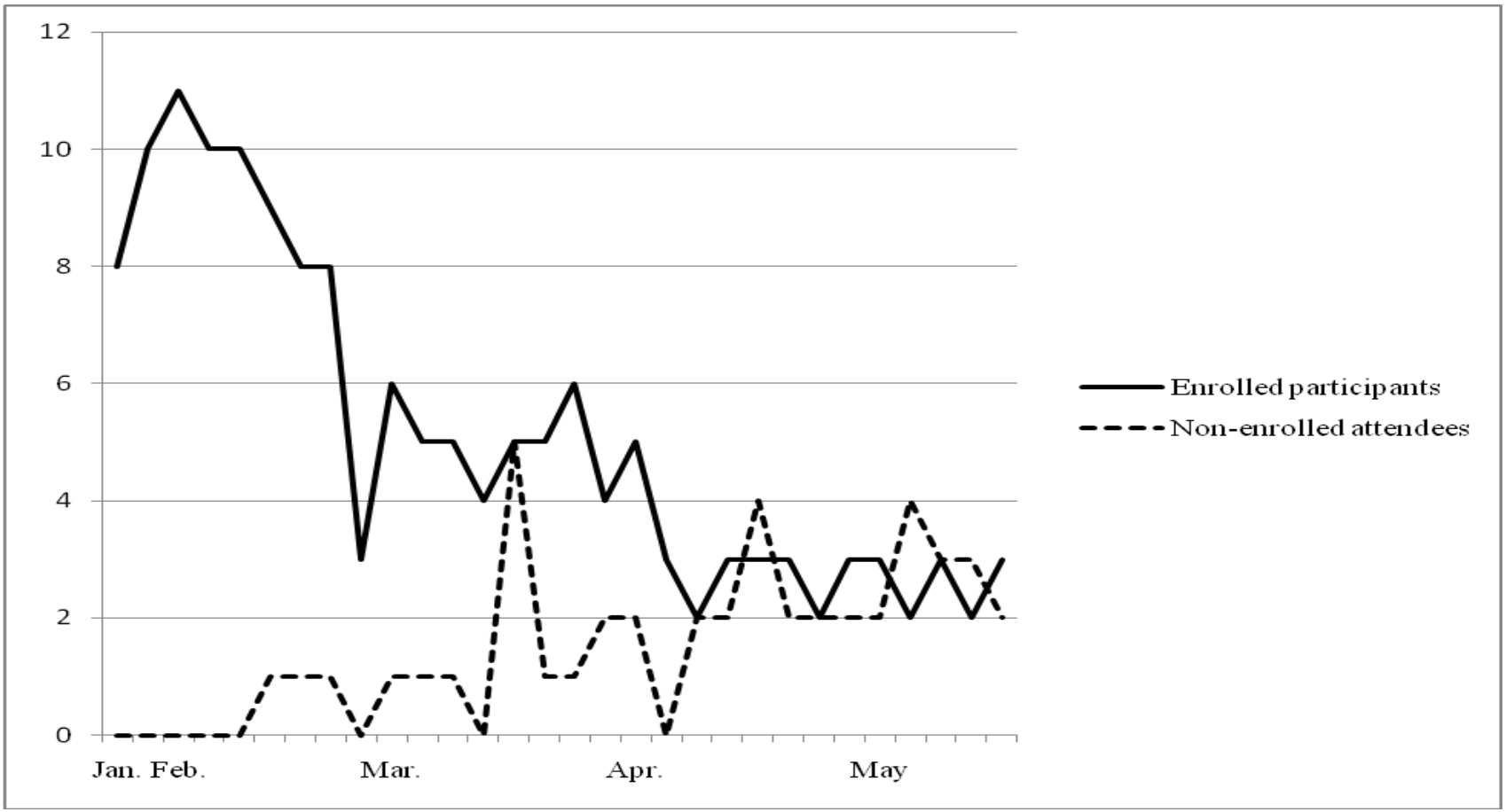

Figure 1. Attendance Graph. This graph shows the number of enrolled participants and non-enrolled students in attendance at each group session at the intervention school during the YCGH Program, 2010

negative tone for some participants, leading to attrition. Finally, behavioral problems between participants during YCGH sessions and during the school day caused two participants to leave the program, one of whom returned after a call from the PI to the student's parents.

Order of Activities

After the school day participants enjoyed active or creative activities to begin sessions, but were not engaged by lessons that required reading or writing for extended periods of time or lessons in which an adult did the majority of the talking. Participants requested active activities to start the sessions and were much more willing to participate in lessons after having some active or less structured time. Therefore, the order of lessons within each session was adjusted to account for this tendency when possible.

Volunteer Training

Along with the PI and Co-PI, volunteers from four organizations assisted with sessions throughout the program. Because all volunteers had prior experience leading school garden programs, there was no formal volunteer training before YCGH. It became apparent during the Photovoice sessions that some volunteers were not familiar with the youth development approach, which sometimes compromised the empowering aspect of the intended youth environment. Volunteers wanted to help participants, but sometimes interfered with the youth development process. This included times when volunteers gave participants suggestions on how to word signs they were creating or provided answers to questions the participants were meant to develop on their own. The PI and Co-PI were able to shift the environment back to one of empowerment in most instances.

Team Building Activities

The first four sessions of the youth development curriculum were team building sessions designed to improve communication in the group, help group members get to know each other, and learn how to work with one another. These sessions were all well received by participants with full active participation throughout. Students who joined the program after these sessions lacked this experience and did not work as well with the group or follow expectations set by the participants during the first two sessions.

Survey Administration

The initial version of the pre-post survey developed to assess program impact was determined to be too long for participants to complete in a reasonable time. The baseline survey was administered over two sessions. After working on surveys for 30 minutes at the first session, surveys were collected and participants played a team building game. Surveys then were completed at the following session. After the two sessions for baseline survey administration participants commented that the program was not what they expected or that it was boring. For the posttest, the survey was modified to a shorter version (Appendix G), which participants were able to complete in one 30 minute session.

Discussion

Theme: Successful Methods for Engaging Youth

Methods that were found to engage youth were creative activities, working in pairs, hands-on activities, and sending them on "missions" to find information (34). These findings are supported by others' suggestions to incorporate hands-on activities into every session of youth programs (34-36). Future interventions should incorporate one or more of these elements into

each session to engage youth with activities they enjoy. The PI's completion of an evaluation form after each session helped to discover these successful methods. Subsequently, this provided immediate feedback used to modify future sessions. This program incorporated more creative, hands-on, paired and "mission" activities after their successes were noted initially. These activities were appropriate for this group, but should not be generalized to all youth in this age group. Instead, staff should complete their own formative evaluations to determine which methods work best with their target group (27).

The SHOWED questions in the Photovoice activity were useful in eliciting meaningful responses from participants, but not all were appropriate for participants in YCGH (34). Participants were most responsive to the theme questions of "What do you see here?", "How does this affect our lives?", and "What can we do?" (37). Sufficient responses for discussion and development of themes were generated by putting the SHOWED questions in a context of things that affect youths' lives. Participants were divided into small groups during this discussion to allow sufficient time to review all of the photographs. Each group was given responsibility for half of the photographs and then brought together to share findings. Strack and colleagues recommend dividing participants into small groups based on their developmental stage to make sessions appropriate for participants of all capacities (34). Although Wilson and colleagues found that adolescents in their study had difficulty responding to the question "How does this affect our lives?", participants in YCGH easily were able to describe how their photographs affected their lives (35). This may have been because photographs were framed in advance as places where kids could grow up healthy, focusing on places to eat and places to play or be

active. With this added context, participants in this study easily were able to describe the implications of each photograph.

Theme: Social Environment Issues

Behavioral Problems

Some behavioral problems encountered in YCGH were off topic conversations, teasing, and difficulty focusing on lessons. Wilson and associates suggest setting clear standards for behavior and consequences for violating those standards. Strack and colleagues also recommend setting standards early by reviewing them during the recruitment process (34). Setting standards for behavior was moderately effective in this study. To adapt this practice to a youth development program, participants should be allowed to identify consequences for violating expectations for behavior for use in extreme cases of problem behaviors, although this was not used in this pilot-test.

For addressing behavioral problems, the use of positive reinforcement in response to desirable behaviors and extinction (planned ignoring) of problem behaviors is recommended (38-40). The use of a visual display of behavior along with positive reinforcement, such as putting a check mark on the board when participants behave in accordance with expectations, can shape social norms in the classroom through the participants' desire to receive a reward for meeting expectations (39). Researchers conducting Photovoice with youth have found that participants were preoccupied with peer approval and establishing social hierarchies during group sessions, which kept the researchers from having serious discussions about the students' photos (35). Establishing rewards for the desired behaviors can shape social norms in the classroom by giving participants incentive to correct their peers' behavior (39).

One common struggle in youth development programs is balancing discipline with empowerment (27, 35). When facilitators focus on creating an empowering atmosphere and don't enforce expectations for behavior, participants may take advantage of the relaxed atmosphere by "acting out." Rather than blaming participants for their behavior, researchers recommend additional staff training in classroom management (35, 41). Additionally, the use of positive reinforcement with participants can contribute to empowerment and has been shown to reduce behavioral problems among elementary participants in a randomized trial (39, 40).

Shyness

The issue of shyness was not realized until the later sessions of this program, so no steps were taken to reduce shyness of participants. Practice in presenting information or role play may be helpful for future interventions to encourage participants to share their findings with others. In conducting interviews with third to fifth grade participants for a formative evaluation of an obesity prevention program, researchers found that interviewing participants in pairs alleviated the shyness of participants (24). The current study found that working in pairs allowed participants time to think while the other in the pair was talking, which stimulated discussion. This method could be used for a presentation on a Photovoice project by allowing participants to work in pairs to develop and deliver the presentation of their findings.

Gender Subgroups

Activities can capitalize on gender differences by allowing youth to work in single-gender groups (27). In this study, allowing youth to self-select between choices of activity created gender subgroups, which helped to forge new friendships within the subgroups. Borden and associates found that girls ranked self-improvement and community-improvement as the

most important reasons for participating in a youth development program, while boys ranked games and social activities as the most important reasons for participation (42). This shows that while both genders find participation in a youth development program important, reasons for participation, expectations, and preferred activities differ across gender groups (42).

Competition

Channeling the energy of participants into healthy competition was a successful way to reduce problem behaviors and increase participation. Participants were highly motivated by games and competition to get the correct answers. Future interventions could incorporate competitive games into team building activities. Tests of knowledge on information taught during the program could establish a pattern where participants are motivated to learn by the desire for success in subsequent games. Freeman and Mathison suggest games as ways to improve group cohesiveness and provide a desirable experience to youth (43).

Theme: Program Management Issues

Attendance

This program experienced a high attrition rate. This was in part due to other afterschool programs occurring at the same time. One suggestion for avoiding such conflict is to consult with school staff and create a chart of all afterschool programs, including tutoring, sports, arts, and afterschool day care programs and select days for the intervention with the least conflict with other programs. Programs that begin later in the year are more difficult to identify and should be considered in scheduling. When attendance was low at one point in this study, phone calls were made to the parents of participants. Attendance improved at the session immediately following the phone calls. Periodic phone calls to parents of participants exhibiting absenteeism may help

to improve attendance in afterschool programs. Classroom management also was found to affect attendance. Program leaders should be observant of any conflict between participants and address it immediately to avoid the development of negative feelings between participants or towards the program. O'Brien and Shoemaker reported an average attendance of 96% (16). Their afterschool garden program ran 10 weeks and served a snack at the start of every session. Although they do not discuss attendance, serving a snack at each session could improve program attendance by providing participants a time to socialize and relax before starting a lesson. Wilson and colleagues reported 55% attendance during an 8-week afterschool physical activity program, which was higher than this study's attendance rate of approximately 38% (27).

Recruitment

Recruitment through participants' peer networks could provide additional participants for afterschool programs. In this study, participants recruited their peers for the program on their own initiative. Asking participants to recruit peers for a program could lead to increased participation in future programs. Encouraging peer recruitment before the first session would allow participants recruited through peers to be a part of a research study.

To reduce attrition in a Photovoice program, Strack and colleagues recommend finalizing recruitment before beginning group sessions so that meaningful activities can begin immediately (34). They also recommend an application process that concludes in signing a contract to introduce program expectations early on and set a standard for accountability (34). Finalizing recruitment prior to the first session is appropriate for studies which require pre-post measures or have a strict timeline for completing activities.

Delgado and Staples state that youth development programs should accept participants into programs continuously to ensure the sustainability of the program (44). When youth are positively engaged in a program, they can be an important part of recruitment for the program and legitimize it to their peers (44). Because it was a youth development program, YCGH accepted new students throughout the year, which could have contributed to attrition and behavioral problems. Participants who were not present for team building activities were noted to exhibit more behavioral problems compared to those who were. Not having an application process could have contributed to the attrition in YCGH by allowing participants to develop a low sense of accountability to the program.

Order of Activities

Wilson and associates found that doing homework activities at the end of an afterschool program increased productivity and decreased behavioral problems (27). The present study's results show further support for this finding. The order of activities in afterschool programs should be considered so that participants have time to transition after the school day. If reading or writing activities are planned, ample active and/or creative time should be allowed in advance so that participants are ready to do thoughtful work (27).

Volunteer Training

The environment of youth development programs is different from other types of afterschool programs. Empowerment is a trait unique to the environment of youth development programs and is critical to achieving program goals. Creating an empowering environment does not come naturally to adults who are comfortable with providing specific directions and suggesting solutions when youth are not taking the expected path in an activity. Curtis notes the

difficulty adults have in relinquishing control of a program and letting youth take the lead (45). She comments that adults often have their own visions for a program, which can be difficult to drop in exchange for creating an empowering atmosphere. The importance of staff training in creating an environment true to program goals was stressed by Wilson and researchers from the Youth Empowerment Strategies and the Teens Eating for Energy and Nutrition at School programs (27, 41, 46). Researchers highlighted the importance of training staff on enforcing program rules while maintaining an empowering environment (27, 41). Leaders must be careful to give youth the room to express their own ideas and desires. Staff for youth development programs should receive training on the components of an empowering environment and how to refrain from interfering with youth problem solving activities.

Team Building Activities

Team building activities provide a time for youth to experience new ways of interacting with peers and facilitates the development of a new peer group (43). Formative results of YCGH support the use of team building activities throughout afterschool program curricula. Such activities could take place at the start of each session to allow youth a break before beginning mentally taxing work. Continuous team building activities throughout the program also would facilitate integration of new members into the group in a youth development program. Strack and colleagues did not incorporate team building into their Photovoice curriculum, but recommended team building during the first few sessions to improve the quality of group discussions (34). Researchers of the Youth Empowerment Strategies dedicated several team building sessions at the beginning of their program and continued to do team building activities as a component of all sessions (35).

Survey Administration

The length of the initial survey for this program was not appropriate for this study's sample. Although all components came from age-appropriate sources, the combination of components from several surveys led to excessive length. Adjustments were made after initial administration of the survey so that it was an appropriate length for the final assessment. These adjustments included eliminating duplicate scales of self-efficacy for FV consumption and using a validated, abbreviated measure of social desirability. No reports of issues with survey administration in youth programs could be found, but other studies report pilot testing surveys before administering them in a pilot program (47, 48). Pilot testing survey measures with representatives of the target population is recommended to determine appropriateness of respondent burden.

Conclusion

These findings show that in an underserved, urban population, a youth development curriculum provided a framework for integrating team building and the creation of an empowering environment into an afterschool program. Photovoice was used to engage youth in learning about their physical activity and nutrition environments and advocating for change. Evaluation after each session was critical for identifying successful strategies for working with participants and modifying the curriculum to suit their preferences. Formative results of the YCGH program agree with others in key areas of program management, strategies for engaging youth, and issues within the social environment. These results support the recommendation of using, at least, a basic formative evaluation tool in programs with youth. Completing this type of

evaluation is helpful in both adjusting an ongoing program to the target population and for informing future programs.

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Appendices

Appendix A: Youth Can! Grow Healthy Curriculum Outline

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
				Youth will:		Instructor	Youth	Community
1. Team Building	Develop emotional and cognitive skills needed for effective team work Develop a sense of group identity Develop a sense of self-worth and understand that one person can be a change agent	**1. & 2. BEING PART OF A TEAM**	The instructor will: 1. Demonstrate the importance of trust for working in teams 2. Facilitate youth identification of group norms and expectations	1. Understand the importance of trust for working in teams 2. Articulate the expectations of their team for good team work	Swing High, Swing Low Trust Train Cooperation Ballgame Expectations List	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: What is a team?	n/a
		3. SAVING STARFISH: MAKING THE WORLD A BETTER PLACE	1. Describe the importance doing small good deeds 2. Encourage youth to use team to make a positive difference	1. Identify a small good deed they have performed in the past 2. Commit to making one positive difference in their own or others lives per week	Saving Starfish story Make waves	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: How can one person make a difference?	n/a
		4. BUT I'M JUST A KID: KIDS WHO DID	1. To teach youth to recognize the heroes around them and within themselves.	1. Identify the 3 reasons why Dusty is a hero 2. Recognize the way it makes them feel to help others 3. Show appreciation to those who help others 4. Imagine themselves as heroes	Narrate Story Ideas and Thoughts from the Youths Write a Letter to Dusty	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: How can you make a difference?	n/a

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
				Youth will:		Instructor	Youth	Community
2. Taking Pride	Improve sense of self worth and power to make small differences Develop a sense of community identity, particularly as it relates to food and physical activity. Discuss the kinds of fruits and vegetables grown in the region. Understand community leadership	**5. YOUTH CAN COOKBOOK**	1. Introduce the concept of food as a marker of cultural identity 2. Celebrate the richness of local food traditions	1. Compare and contrast familial foodways with team members 2. Understand the cultural significance of food in the region 3. Develop a book of team recipes	Sharing food stories Who are the people who feed me well? Cookbook	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: What do you want people to learn from your cookbook?	n/a
		6. GROWING GOOD FOOD FOR THE SAKE OF THE EARTH	1. Communicate the role of caring for the local environment in eating healthy foods 2. Provide examples of how youth can promote growing good food	1, Describe the importance of locally grown foods. 2. Describe what organic farming is 3. List places that they can get locally grown foods	What foods are grown here? Growing organic food	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: Where can you get local food?	n/a
		7. COMMUNITY TOUR	1. Describe what a community is 2. Introduce the concept of healthy communities	1. Describe the types of foods that are available in their community. 2. Describe the types of physical activity they can do in their community	Treasure Hunt in the Community	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question How can Youth Can! Members help the community? How can the community help Youth Can! members	n/a

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
				Youth will:		Instructor	Youth	Community
2. Taking Pride	Improve sense of self worth and power to make small differences Develop a sense of community identity, particularly as it relates to food and physical activity. Discuss the kinds of fruits and vegetables grown in the region. Understand community leadership	**8. WHO ARE MY COMMUNITY LEADERS?**	1. Facilitate the identification of community leaders 2. Introduce youth to community leadership	1. Name 2 methods of identifying community leaders 2. Identify 10 leaders in their community 3. Invite community leaders to a panel discussion. 4. Write at least 2 question for the panel	Identify community leaders Letter writing Question Development	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: What do you think community leaders to do?	At least 7 community leaders will agree to attend panel discussion of what their role is in the community.
		9. STORYTELLING	1. Introduce children to how storytelling has played a part of cultural heritage. 2. Introduce children to storytelling. 3. Allow children to explore and voice their language skills.	1. List aspects of life that help define cultural heritage. 2. Work together to develop and orate a tall tale. 3. Discuss how some tall tales and myths about food might influence what they eat.	All that's left is the story Weaving a tale	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question	n/a

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
				Youth will:		Instructor		
3. My Healthy Body	Understand how food and physical activity can help keep people healthy Develop an awareness of the link between healthy food and movement and health	**10. AM I WHAT I EAT?**	1. Introduce MyPyramid food groups 2. Facilitate a discussion about healthy foods	1. List 2 ways to eat healthy 2. List the food groups from MyPyramid	Placemat portraits	Implementation checklist Expectations list	Accomplishments List Expectations list	n/a
		11. LOVE TO MOVE	1. Facilitate group discussion about physical activity and how it relates to a healthy body.	1. List 4 things that happen to your body when you exercise 2. List 2 types of healthy physical activity	What's your favorite activity pantomime How do you like to move it?	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question	n/a
		12. TESTING DRAMAS: A PLAY ABOUT FOOD	1. Teach youth to use art and dramatic play to communicate important ideas 2. Communicate the concepts of food and movement for health through characters in play	1. Communicate information to other people with theatric skills. 2. Understand the role of MyPyramid food groups in health 3. Understand the role of movement and physical activity in health	Create Characters Create Story Board	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: Do you know which foods each character will promote?	n/a

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
				Youth will:		Instructor		
4. Research for Change	Use data to identify priorities for change Identify research questions Collect and analyze information about the community food and physical activity environments	**13. & 14. PHOTOVOICE**	1. Develop students understanding of community, food environment, and physical activity environment. 2. Provide children with the skills necessary to take photographs of their community's food and physical activity environments. 3. Discuss photovoice ethics and procedures	1. Take at least 3 photographs of components of the food and physical activity environment. 2. Identify 1 strength and 1 weakness in their community environment. 3. List 2 things they like about their community 4. List 1 thing they would like to improve in their community.	Photovoice Assignment Displaying photographs What is a healthy community discussion Assessing the food and nutrition environment Making the lists.	Implementation checklist Expectations list	Accomplishments List Expectations list	N/A
		15. WHAT DO YOU DEDUCE, SHERLOCK?	1. Facilitate the use of research to document gaps in the community food and physical activity environments 2. Develop critical thinking skills of youth by encouraging evaluation of community food and physical activity environments	1. Use the scientific method to document school food issues 2. Students will identify the people, places and things that characters from "Taste Testing Dramas" would promote 3. Students will critically evaluated the food and physical activity environment	Developing a hypothesis Detective Work	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: What did you learn about your school food environment?	n/a

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
						Instructor	Youth	Community
		16. PART II			Graphing Results	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: Do you know which foods each character will promote?	n/a
		17. PART III			The Plan: Persuading Community Leaders	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: What do you want to stay the same? What do you want to change?	n/a
5. Communicating with people in my community	Develop skills and strategies to communicate Communicate information about the community food and physical activity environments to parents, school teachers, principal, and Coordinated School Health Program personnel	**18. & 19. THE YOUTH CAN! GROW HEALTHY NEWSPAPER**	1. Provide structure and functional parts of newsletters 2. Facilitate the development of newsletter 3. Assist in paper distribution	Youth will: 1. Communicate persuasive information to other people with through writing 2. Produce a newsletter 3. Distribute newsletter to key stakeholders	Layout Writing the articles Putting it Together	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: What do you want people to do when they read the paper? What did the community members think about the newspaper?	Read newsletter

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
						Instructor	Youth	Community
		20. BEING AN ADVOCATE	1. Define the words advocate, power and youth empowerment. 2. Help children realize they can bring about change in the community. 3. Demonstrate examples of how youth advocates have made differences in their communities 4. Have children realize times they have tried to make their voice heard.	1. Define the words advocate, power and youth empowerment mean 2 List 1positive example of children who made a difference in their community 3. Understand when advocacy is the best communication strategy	Define and discuss words Working Up the Power Ladder	Implementation checklist Expectations list	Accomplishments List Expectations list	n/a
		21. BEING AN AMBASSADOR	1. Describe the differences between diplomatic and persuasive language	1. Identify words, expressions and body language that are diplomatic 2. Use diplomatic language to describe the community's food and physical activity environments	The dog The diplomat and the dog Practice ways to communicate the plan	Implementation checklist Expectations list	Accomplishments List Expectations list	n/a

UNIT	GOALS	LESSON	TEACHING OBJECTIVES	LEARNING OBJECTIVES	ACTIVITIES	EVALUATION		
						Instructor	Youth	Community
6. Advocate for change	Develop skills and strategies to advocate for change Communicate information about the community food and physical activity environments to community leaders	**22. COMMUNICATING THE PLAN: PART 1**	To allow students to prepare for presenting their plan to community leaders To develop students communication and negotiation skills	1. Students will plan the actions they want to take in their community 2. Students will decide who they need to ask to implement their plan 3. Students will identify effective communication, advocacy, diplomatic, and asking skills	What do we want? Asking Skills Asking our community leaders to attend or if we can attend their meeting	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: Can you advocate for what you want? What happens if they can't help?	At least 6 community leaders will be invited to attend plan meeting OR students may opt to present their findings to community leaders at an organizational meeting, such as Food Policy Council, City Council or County Commission meetings
		23. COMMUNICATING THE PLAN PART II	To allow students to present their plan to community leaders To allow students to practice communication, advocacy, diplomatic, and asking skills	1. Students will present their plan to community leaders. 2. Students will demonstrate effective communication, advocacy, diplomatic, and asking skills	Present the Plan: What we want done and why Asking skills Asking community leaders if they can help with the plan	Implementation checklist Expectations list	Discussion Question: Did you do your best? What happens if they can't help?	At least 5 community leaders will be present at the Communicating the Plan Presentation
		24. VEG OUT PARTY	1. Encourage youth to be proud of the work they have done 2. Give youth the opportunity to acknowledge each other's contributions 3. Celebrate successes	1. Recognize the work of their teammates 2. Develop self-esteem about their role in making positive change	Look Back Appreciation Exercise Building my collage	Implementation checklist Expectations list	Accomplishments List Expectations list Discussion Question: Who else can help with the plan?	n/a

Appendix B: Variable Table

Variable	Coding Criteria
Independent	
Group	After school garden program vs. Youth Can! Grow Healthy Program
Dependent	
FV Intake	Score 0-3 on number of times consumed the previous day. Sum responses (range 0-9).
FV Preference	Sum responses for 16 fruits and vegetables on Likert scale ranging 1-5. Divide total by 16. High score= high preference for food.
Self-efficacy to consume FV	Sum responses from 5 Likert scale questions ranging 1-4. 4=high self-efficacy
Self-efficacy to garden	Sum responses for 11 Likert questions ranging 1-5. 5= high self-efficacy (range=0-55)
School Connectedness	Sum responses for 40 Likert scale questions ranging 1-4, (reversing negative questions). Divide total by 40.
Co variables	
Social desirability	Sum responses to 14 yes/no questions, reversing negative questions. Range = 0-14
BMI	Overweight- at or above 85th percentile Obese- at or above 95th percentile *calculated using CDC BMI-for-age spreadsheet
Activity Level	Score created by summing questions for: Active behaviors (5,10) Sedentary behaviors (6,7,8,9) (in section 1 of the survey)
Demographics	
Age	In Years & months
Grade level	4th or 5th
Race	American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or other Pacific Islander, White
Ethnicity	Hispanic or Latino- Yes or No
Gender	Male/Female

Appendix C: Original Survey

Thank you for agreeing to complete

The Youth can Grow Healthy Survey!

The questions you are about to complete are very important. Please answer the questions as best you can; there are no right or wrong answers. If something doesn't make sense or you have a question, please ask one of the leaders.

Your help with this project is greatly appreciated!

AFTER-SCHOOL STUDENT QUESTIONNAIRE

The following questions ask about foods and meals you eat, and what you know about nutrition and physical activity. **This is not a test.** We want to learn about what kids your age eat and know about nutrition and about physical activity.

The answers you give will be kept private. Your name will never be used.

Taking this survey is up to you. Your choice about taking it will not affect how you are treated in this program.

Please be as honest as you can.
INSTRUCTIONS: Please <u>CIRCLE</u> your answer. [1]

1. Yesterday, did you eat any vegetables?
***Vegetables* are salads; boiled, baked and mashed potatoes; and all cooked and uncooked vegetables.**
<u>Do not count</u> French fries or chips.

a. No, I didn't eat any vegetables yesterday.
b. Yes, I ate vegetables **1 time** yesterday.
c. Yes, I ate vegetables **2 times** yesterday.
d. Yes, I ate vegetables **3 or more times** yesterday.

2. Yesterday, did you eat beans such as pinto beans, baked beans, kidney beans, refried beans, or pork and beans? <u>Do not count</u> green beans.

a. No, I didn't eat any beans yesterday.
b. Yes, I ate beans **1 time** yesterday.
c. Yes, I ate beans **2 times** yesterday.
d. Yes, I ate beans **3 or more times** yesterday.

3. Yesterday, did you eat fruit? <u>Do not count</u> fruit juice.

a. No, I didn't eat any fruit yesterday.
b. Yes, I ate fruit **1 time** yesterday.
c. Yes, I ate fruit **2 times** yesterday.
d. Yes, I ate fruit **3 or more times** yesterday.

4. Yesterday, did you drink fruit juice?
<u>Fruit juice</u> is a drink, which is 100% juice, like orange juice, apple juice, or grape juice.
<u>Do not count</u> punch, Kool-aid, sports drinks, and other fruit-flavored drinks.

a. No, I didn't drink any fruit juice yesterday.
b. Yes, I drank fruit juice **1 time** yesterday.
c. Yes, I drank fruit juice **2 times** yesterday.
d. Yes, I drank fruit juice **3 or more times** yesterday.

[1] Adapted from the SPAN survey

[1]**5. Yesterday, did you exercise or participate in sports activities that made your heart beat fast and made you breathe hard for at least 20 minutes. (For example: basketball, jogging, skating, fast dancing, swimming laps, tennis, fast bicycling, or aerobics)?**

a. YES
b. NO

6. How many TV shows or videos do you watch during the week?

a. I don't watch TV or videos
b. 1
c. 2
d. 3 or more

7. How many TV shows or videos do you watch during the weekend?

a. I don't watch TV or videos
b. 1
c. 2
d. 3 or more

8. During the week, how many hours <u>per day</u> do you <u>usually</u> play video games like Nintendo, PlayStation, games at the arcade, or use the computer to surf the Internet?

a. I don't play video games or use the computer
b. Less than 1 hour a day
c. 1-2 hours a day
d. 3-4 hours a day
e. More than 4 hours a day

[1] Adapted from the SPAN survey

[1] **9. During the weekend, how many hours <u>per day</u> do you <u>usually</u> play video games like Nintendo, PlayStation, games at the arcade, or use the computer to surf the Internet?**

a. I don't play video games or use the computer
b. Less than 1 hour a day
c. 1-2 hours a day
d. 3-4 hours a day
e. More than 4 hours a day

10. During the past 12 months, on how many sports teams did you play? Sports teams are baseball teams, soccer teams, swim teams, basketball teams or football teams.

a. 0 teams
b. 1 team
c. 2 teams
d. 3 or more teams

11. From which food group should you eat the *<u>most</u>* servings each day? Choose only <u>one</u> group.

a. breads, cereals, rice, pasta
b. dairy products (milk, cheese)
c. fats, oils, sweets
d. fruits
e. meats, fish, poultry, beans, eggs, nuts
f. vegetables
g. don't know

12. From which food group should you eat the *<u>fewest</u>* servings each day? Choose only <u>one</u> group.

a. breads, cereals, rice, pasta
b. dairy products (milk, cheese)
c. fats, oils, sweets
d. fruits
e. meats, fish, poultry, beans, eggs, nuts
f. vegetables
g. don't know

[1] Adapted from the SPAN survey

[1]

13. How many total servings of fruits and vegetables should you eat each day?

a. At least 2
b. At least 5
c. At least 8
d. At least 10
e. I don't know

14. What you eat can make a difference in your chances of getting heart disease or cancer.

a. YES
b. NO
c. I don't know

15. The foods that I eat and drink now are healthy.

a. Yes, all of the time
b. Yes, sometimes
c. No

16. I like to try new foods.

a. Almost always or always
b. Sometimes
c. Almost never or never

17. Do you ever drink 100% fruit juice?

a. Almost always or always
b. Sometimes
c. Almost never or never

18. Do you ever eat fruit for lunch?

a. Almost always or always
b. Sometimes
c. Almost never or never

[1] Adapted from the SPAN survey

[1]19. Do you ever eat vegetables for dinner?

a. Almost always or always
b. Sometimes
c. Almost never or never

INSTRUCTIONS: The questions in this section ask how sure you are about being physically active. Please answer by circling either NOT SURE, A LITTLE SURE or VERY SURE for each question.

20. How sure are you that you can be physically active 3-5 times a week?

a. Not sure
b. A little sure
c. Very sure

21. How sure are you that you can exercise and keep moving for most of the time in your after school program?

a. Not sure
b. A little sure
c. Very sure

22. How sure are you that you can improve your physical fitness by running or biking 3-5 times a week?

a. Not sure
b. A little sure
c. Very sure

23. How sure are you that you can keep up a steady pace without stopping for 15-20 minutes when you are physically active?

a. Not sure
b. A little sure
c. Very sure

[1] Adapted from the SPAN survey

	Please circle **two** answers for each food. [1]		Choose No **or** Yes; -Then, choose 1 **or** 2 **or** 3 **or** 4 **or** 5		**What do you think about this food?**				
1			**Have you ever eaten this food?**		I really do not like it!	I do not like it.	It is OK.	I like it a little.	I really like it a lot!
	a.	cucumbers	No	Yes	1	2	3	4	5
	b.	lettuce	No	Yes	1	2	3	4	5
	c.	spinach	No	Yes	1	2	3	4	5
	d.	tomatoes	No	Yes	1	2	3	4	5
	e.	sugar snap peas	No	Yes	1	2	3	4	5
	f.	carrots	No	Yes	1	2	3	4	5
	g.	beans	No	Yes	1	2	3	4	5
	h.	radishes	No	Yes	1	2	3	4	5
	i.	peppers	No	Yes	1	2	3	4	5
	j.	zucchini	No	Yes	1	2	3	4	5
	k.	beets	No	Yes	1	2	3	4	5
	l.	apples	No	Yes	1	2	3	4	5
	m.	strawberries	No	Yes	1	2	3	4	5
	n.	raspberries	No	Yes	1	2	3	4	5
	o.	melons (cantaloupe, musk melon)	No	Yes	1	2	3	4	5
	p.	watermelon	No	Yes	1	2	3	4	5

[1] Adapted with permission

This section will ask you questions about foods that you like to eat. Some questions will ask you to rate a food, and others will ask you to pick between two foods.
INSTRUCTIONS: Please CIRCLE your answers.[1]

2. When I get home from school, I would prefer to have…

	A.			B.
1	my favorite fruit	OR	2	my favorite cookie
1	my favorite fruit	**OR**	2	my favorite candy bar
1	peanut butter on bread	**OR**	2	my favorite raw vegetable & dip
1	peanut butter on bread	**OR**	2	my favorite fruit
1	chips	**OR**	2	my favorite raw vegetable & dip
1	chips	OR	2	my favorite fruit
1	my favorite soda/pop	**OR**	2	my favorite fruit
1	my favorite candy bar	**OR**	2	my favorite raw vegetable & dip

3. How sure are you that you could…

		Not at all sure	Somewhat sure	Sure	Very sure
a.	Eat fruit for a snack when you are hungry?	1	2	3	4
b.	Eat fruit for dessert, even if there are cookies around?	1	2	3	4
c.	Eat vegetables at dinner, even if they are not your favorite kind?	1	2	3	4
d.	Eat fruit for a snack when you come home?	1	2	3	4
e.	Eat cut-up vegetables for a snack?	1	2	3	4

[1] Adapted with permission

Social Desirability Scale[1]

This section is a series of yes or no questions, with YES or NO after each question. Please read each question and answer whether you agree (YES) or disagree (NO) with the statement, and then circle your answer.

Instructions: Circle YES or NO for each question.

1. Have you ever felt like saying unkind things to a person? **YES NO**

2. Are you always careful about keeping your clothing neat and you room picked up? **YES NO**

3. Do you sometimes feel like staying home from school even if you are not sick? **YES NO**

4. Do you ever say anything that makes somebody else feel bad? **YES NO**

5. Are you always polite, even to people who are not very nice? **YES NO**

6. Sometimes do you do things you've been told not to do? **YES NO**

7. Do you always listen to your parents? **YES NO**

8. Do you sometimes wish you could just play around instead of having to go to school? **YES NO**

9. Have you ever broken a rule? **YES NO**

10. Do you sometimes feel angry when you don't get your way? **YES NO**

11. Do you sometimes feel like making fun of other people? **YES NO**

12. Do you always do the right things? **YES NO**

13. Are there some times when you don't like to do what your parents tell you? (Mind your parents?) **YES NO**

14. Do you sometimes get mad when people don't do what you want them to do? **YES NO**

[1] Adapted with permission

Social Connectedness Scale[1]

Please use this survey to tell us what you do and who you are. Read each statement. Circle the number that best describes how true that statement is for you. If a statement is unclear to you, ask for an explanation. If the statement is *still* unclear or does not apply to you, circle the number and put a "?".

Instructions: Circle the number that best describes how true that statement is for you

How true about you is each sentence?

Not true=**1** Sort of true=**2** True =**3** Very True =**4**

	Not true	Sort of true	True	Very true
1. There are lots of things to do in my neighborhood	1	2	3	4
2. I know how to get along with my parents	1	2	3	4
3. I work hard at school.	1	2	3	4
4. I like all of the kids in my class.	1	2	3	4
5. I am good at reading.	1	2	3	4

	Not true	Sort of true	True	Very true
6. My friends know a lot about me.	1	2	3	4
7. I like spending time with my parents.	1	2	3	4
8. I try to get good grades in school.	1	2	3	4
9. There are many kids at my school who I do not like.	1	2	3	4
10. For fun I read on my own.	1	2	3	4

[1] Adapted with permission

1

	Not true	Sort of true	True	Very true
11. I like to spend time with my friends.	1	2	3	4
12. I play with my brothers (or sisters) a lot. (leave blank if only child)	1	2	3	4
13. I feel good about myself at school.	1	2	3	4
14. I have a hard time paying attention in math class.	1	2	3	4
15. I work hard at school.	1	2	3	4

	Not true	Sort of true	True	Very true
16. I play a lot in my neighborhood.	1	2	3	4
17. I don't like my brothers or sisters. (leave blank if you have none)	1	2	3	4
18. I always do what my teachers tell me to do.	1	2	3	4
19. I always get bored in school.	1	2	3	4
20. I love to read.	1	2	3	4

	Not true	Sort of true	True	Very true
21. I can name 5 things that other kids really like about me	1	2	3	4
22. I want my teachers to be proud of me.	1	2	3	4
23. I always do what my teachers tell me to do.	1	2	3	4
24. I get into fights with other kids.	1	2	3	4
25. I read for fun when I have free time.	1	2	3	4

[1] Adapted with permission

1

	Not true	Sort of true	True	Very true
26. I am lonely in my neighborhood.	1	2	3	4
27. My family like the kind of kid I am.	1	2	3	4
28. My teachers like me.	1	2	3	4
29. I never get in trouble at school.	1	2	3	4
30. I trust my friends.	1	2	3	4

	Not true	Sort of true	True	Very true
31. My sisters (or brothers) are fun to be with. (leave blank if you have none)	1	2	3	4
32. I like school.	1	2	3	4
33. I can't sit still in class.	1	2	3	4
34. I don't have many friends.	1	2	3	4
35. My family are always proud of me.	1	2	3	4

	Not true	Sort of true	True	Very true
36. School is a fun place.	1	2	3	4
37. I get along with all of the kids in my classes.	1	2	3	4
38. I wish I did not get into so much trouble.	1	2	3	4
39. I like school.	1	2	3	4
40. I am a popular kid.	1	2	3	4

[1] Adapted with permission

Read the information on gardening, and then answer questions 1-11 by filling in the circle that goes with your answer

Gardening is growing and taking care of plants for their attractive flowers and for the vegetables or fruits to eat. We can garden outside in the ground and containers, and inside in containers.[1]

Instructions: Fill in the circle that goes with your answer.

	Not at all sure			**Somewhat sure**	**Very sure**	
	0	1	2	3	4	5
1. How sure are you that you can plan a garden?	○	○	○	○	○	○
2. How sure are you that you can find a place to garden?	○	○	○	○	○	○
3. How sure are you that you can grow a plant that produces a fruit or vegetable that you like to eat?	○	○	○	○	○	○
4. How sure are you that you can grow more than one kind of plant?	○	○	○	○	○	○
5. How sure are you that you can plant a seed that will grow into a small plant?	○	○	○	○	○	○
6. How sure are you that you can water a garden, so that it will stay alive?	○	○	○	○	○	○
7. How sure are you that you can weed a garden, to help plants grow?	○	○	○	○	○	○
8. How sure are you that you can garden no matter how busy your day is?	○	○	○	○	○	○
9. How sure are you that you can garden no matter how tired you may feel?	○	○	○	○	○	○
10. How sure are you that you can garden even if it is hot or cold outside?	○	○	○	○	○	○
11. How sure are you that you can garden even if you have homework?	○	○	○	○	○	○

[1] Adapted with permission

Appendix D: Photovoice Discussion Questions

SHOWED Questions[1]:

What do you see here?

What is really happening here?

How does this affect our lives?

Why does this concern, situation, strength exist?

How can we be empowered through our new understanding?

What can we do?

POTENTIAL PROBES FOR PHOTOS[2]

Clarifying Questions

1. Please tell me more about what this picture has to do with youth [may want to point out a particular object or place in the photo].
2. Please tell me more about the things in this picture. Why did you want to focus on them?
3. Tell me more about why you took this picture.

Probing Questions

1. How does this picture show things that affect how youth [eat/play/be active]? What other things about the food/PA environment did you see that you did not present in a photo?
2. I see that in this photo, you highlight [insert object/place]. Tell me more about this object/situation and how it relates to kids growing up healthy (through nutrition/activity environment or both)?
3. What does this photo **not** show?
4. How is your photo different from and similar to the others that were taken?
5. Why do you want to share this photo?
6. What's the real story this photo tells?

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[1] Hergenrather K, Rhodes S, Bardhoshi G. Photovoice as Community-Based Participatory Research: A Qualitative Review. *American Journal of Health Behavior.* 2009;33:686-698.

[2] Adapted from: www.theinnovationcenter.com

Appendix E: Summary of Lessons

Week	School Garden Lesson	Youth Development Lesson
1		Being Part of a team/pretest
1		Team building/trust train/pretest
2	Plant needs	Saving starfish
3	Plant parts/pretest	But I'm just a Kid: Kids who did
4	Indoor growing/edible parts of plants/indoor signs	Youth Can! Cookbook.
5	Soil/compost/earth apple activity	Who are my community leaders?
6	Plant nutrients- rap from JMG	Am I what I eat/love to move
7	Ground rules/site evaluation	Photovoice I- rules, playground, worked on posters
8	Raised bed prep-painted and laid newspaper on bottom	Photovoice II- WV park
9	Seasonal plants, seed starting(trays for raised bed)	Getting to know community leaders panel
10	Pollination	Photovoice III- Walked up western avenue
11	Spring break	Spring break
12	Filled raised bed with soil and planted in raised bed	Photovoice IV/SHOWED/Sherlock
13	Label reader, plant nutrients	Posters-30min, Photovoice V- listed leaders to invite to 2nd meeting
14	Organic vs. conventional	Finished posters, Photovoice VI- set deadlines for "our plan"
15	Bugs, posttest	Photovoice VII- Finished PowerPoint for meeting, diplomat the dog activity, posttest
16	Organic vs. conventional, posttest	Photovoice- VIII- Presentation to community leaders
17		Celebration

Appendix F: Session Evaluation Tool

AmeriCorps: Urban Agriculture Team Documentation/Evaluation Form

Date of Activity	Lead Americorps Member
School/Organization	School/Organization Contact (e.g. teacher)
# of participating students	# of volunteers

Summary of Activity: _____

_____

_____

_____

Describe (on back and/or attach sheets)

1) UAT Activity

- If lesson is described in manual, identify which one it is and describe any modifications you made to it. Attach any new materials/handouts you have created.
- If activity is from another curriculum, attach photocopy of it and describe any modifications you made to it.
- If you created the activity, describe it in enough detail that it could be replicated by another member. Include performance objectives (ie what will the students be able to do at the completion of the activity) how it was implemented, any associated handouts and/or overheads and a list of supplies/equipment

2) What aspects of the activity did you think were effective and what aspects weren't?

3) If and how the activity was evaluated (before/after oral questioning, written essays, exhibits, portfolios, drawings)

4) Oral Questioning (ask students one or more questions related to the concepts/skills being conveyed through the activity prior to and at the completion of the activity. Estimate percent that can correctly answer the questions.

Identify Question: _____

_____

Pre activity	0-25%	25-50%	50-75%	75-100%
Post activity	0-25%	25-50%	50-75%	75-100%

Appendix G: Modified Survey

Thank you for agreeing to complete

The Youth Can Grow Healthy Survey!

The questions you are about to complete are very important. Please answer the questions as best you can; there are no right or wrong answers. If something doesn't make sense or you have a question, please ask one of the leaders.

AFTER-SCHOOL STUDENT QUESTIONNAIRE

The following questions ask about foods and meals you eat, and what you know about nutrition and physical activity. **This is not a test.** We want to learn about what kids your age eat and know about nutrition and about physical activity.

The answers you give will be kept private. Your name will never be used.

Taking this survey is up to you. Your choice about taking it will not affect how you are treated in this program.

Please be as honest as you can.

Your help with this project is greatly appreciated!

INSTRUCTIONS: Please <u>CIRCLE</u> your answer. [1]

1. Yesterday, did you eat any vegetables?

Vegetables **are salads; boiled, baked and mashed potatoes; and all cooked and uncooked vegetables.**

<u>Do not count</u> French fries or chips.

a. No, I didn't eat any vegetables yesterday.
b. Yes, I ate vegetables **1 times** yesterday.
c. Yes, I ate vegetables **2 times** yesterday.
d. Yes, I ate vegetables **3 or more times** yesterday.

2. Yesterday, did you eat fruit? <u>Do not count</u> fruit juice.

a. No, I didn't eat any fruit yesterday.
b. Yes, I ate fruit **1 time** yesterday.
c. Yes, I ate fruit **2 times** yesterday.
d. Yes, I ate fruit **3 or more times** yesterday.

3. Yesterday, did you drink fruit juice?

<u>Fruit juice</u> is a drink, which is 100% juice, like orange juice, apple juice, or grape juice.

<u>Do not count</u> punch, Kool-aid, sports drinks, and other fruit-flavored drinks.

a. No, I didn't drink any fruit juice yesterday.
b. Yes, I drank fruit juice **1 time** yesterday.
c. Yes, I drank fruit juice **2 times** yesterday.
d. Yes, I drank fruit juice **3 or more times** yesterday.

4. Yesterday, did you exercise or participate in sports activities that made your heart beat fast and made you breathe hard for at least 20 minutes. (For example: basketball, jogging, skating, fast dancing, swimming laps, tennis, fast bicycling, or aerobics)?

a. YES
b. NO

5. How many TV shows or videos do you watch during the week?

a. I don't watch TV or videos
b. 1
c. 2
d. 3 or more

6. How many TV shows or videos do you watch during the weekend?

a. I don't watch TV or videos
b. 1
c. 2
d. 3 or more

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[1] Adapted from the SPAN survey

[1] 7. During the week, how many hours <u>per day</u> do you <u>usually</u> play video games like Nintendo, PlayStation, games at the arcade, or use the computer to surf the Internet?

a. I don't play video games or use the computer
b. Less than 1 hour a day
c. 1-2 hours a day
d. 3-4 hours a day
e. More than 4 hours a day

8. During the weekend, how many hours <u>per day</u> do you <u>usually</u> play video games like Nintendo, PlayStation, games at the arcade, or use the computer to surf the Internet?

a. I don't play video games or use the computer
b. Less than 1 hour a day
c. 1-2 hours a day
d. 3-4 hours a day
e. More than 4 hours a day

9. During the past 12 months, on how many sports teams did you play?
Sports teams are baseball teams, soccer teams, swim teams, basketball teams or football teams.

a. 0 teams
b. 1 team
c. 2 teams
d. 3 or more teams

10. Do you ever drink 100% fruit juice?

a. Almost always or always
b. Sometimes
c. Almost never or never

11. Do you ever eat fruit for lunch?

a. Almost always or always
b. Sometimes
c. Almost never or never

12. Do you ever eat vegetables for dinner?

a. Almost always or always
b. Sometimes
c. Almost never or never

13. Do you have a fruit or vegetable garden at home?

a.YES
b NO

This section will ask you questions about foods that you like to eat. Some

[1] Adapted from the SPAN survey

questions will ask you to rate a food, and others will ask you to pick between two foods. INSTRUCTIONS: Please <u>CIRCLE</u> your answers.[1]

					What do you think about this food?				
1.	Please circle **<u>two</u>** answers for each food. -Choose No **or** Yes; -Then, choose 1 **or** 2 **or** 3 **or** 4 **or** 5[1]		**Have you ever eaten this food?**		 I really do not like it.	 I do not like it.	 It is ok.	 I like it a little.	 I really like it a lot.
	a.	cucumbers	No	Yes	1	2	3	4	5
	b.	lettuce	No	Yes	1	2	3	4	5
	c.	spinach	No	Yes	1	2	3	4	5
	d.	tomatoes	No	Yes	1	2	3	4	5
	e.	sugar snap peas	No	Yes	1	2	3	4	5
	f.	carrots	No	Yes	1	2	3	4	5
	g.	beans	No	Yes	1	2	3	4	5
	h.	radishes	No	Yes	1	2	3	4	5
	i.	peppers	No	Yes	1	2	3	4	5
	j.	zucchini	No	Yes	1	2	3	4	5
	k.	beets	No	Yes	1	2	3	4	5
	l.	apples	No	Yes	1	2	3	4	5
	m.	strawberries	No	Yes	1	2	3	4	5
	n.	raspberries	No	Yes	1	2	3	4	5
	o.	melons (cantaloupe, musk melon)	No	Yes	1	2	3	4	5
	p.	watermelon	No	Yes	1	2	3	4	5

[1] Adapted with permission

2. **When I get home from school, I would prefer to have…**[1]

	A.			B.
1	my favorite fruit	OR	2	my favorite cookie
1	my favorite fruit	**OR**	2	my favorite candy bar
1	peanut butter on bread	**OR**	2	my favorite raw vegetable & dip
1	peanut butter on bread	**OR**	2	my favorite fruit
1	chips	**OR**	2	my favorite raw vegetable & dip
1	chips	OR	2	my favorite fruit
1	my favorite soda/pop	**OR**	2	my favorite fruit
1	my favorite candy bar	**OR**	2	my favorite raw vegetable & dip

3. How sure are you that you could…

		Not at all sure	Somewhat sure	Sure	Very sure
a.	Eat fruit for a snack when you are hungry?	1	2	3	4
b.	Eat fruit for dessert, even if there are cookies around?	1	2	3	4
c.	Eat vegetables at dinner, even if they are not your favorite kind?	1	2	3	4
d.	Eat fruit for a snack when you come home?	1	2	3	4
e.	Eat cut-up vegetables for a snack?	1	2	3	4

[1] Adapted with permission

This section is a series of yes or no questions, with YES or NO after each question. Please read each question and answer whether you agree (YES) or disagree (NO) with the statement, and then circle your answer.[1]

Instructions: <u>Circle YES or NO for each question.</u>

1. Have you ever felt like saying unkind things to a person? **YES NO**

2. Are you always careful about keeping your clothing neat and you room picked up? **YES NO**

3. Do you sometimes feel like staying home from school even if you are not sick? **YES NO**

4. Do you ever say anything that makes somebody else feel bad? **YES NO**

5. Are you always polite, even to people who are not very nice? **YES NO**

6. Sometimes do you do things you've been told not to do? **YES NO**

7. Do you always listen to your parents? **YES NO**

8. Do you sometimes wish you could just play around instead of having to go to school? **YES NO**

9. Have you ever broken a rule? **YES NO**

10. Do you sometimes feel angry when you don't get your way? **YES NO**

11. Do you sometimes feel like making fun of other people? **YES NO**

12. Do you always do the right things? **YES NO**

13. Are there some times when you don't like to do what your parents tell you? (Mind your parents?) **YES NO**

14. Do you sometimes get mad when people don't do what you want them to do? **YES NO**

[1] Adapted with permission

School Connectedness Scale[1]

Please use this survey to tell us what you do and who you are. Read each statement. Circle the number that best describes how true that statement is for you. If a statement is unclear to you, ask for an explanation. If the statement is *still* unclear or does not apply to you, circle the number and put a "?".

Instructions: Circle the number that best describes how true that statement is for you

How true about you is each sentence?

Not true=**1** Sort of true=**2** True =**3** Very True =**4**

	Not true	Sort of true	True	Very true
1. There are lots of things to do in my neighborhood	1	2	3	4
2. I know how to get along with my parents	1	2	3	4
3. I work hard at school.	1	2	3	4
4. I like all of the kids in my class.	1	2	3	4
5. I am good at reading.	1	2	3	4

	Not true	Sort of true	True	Very true
6. My friends know a lot about me.	1	2	3	4
7. I like spending time with my parents.	1	2	3	4
8. I try to get good grades in school.	1	2	3	4
9. There are many kids at my school who I do not like.	1	2	3	4
10. For fun I read on my own.	1	2	3	4

[1] Adapted with permission

1

	Not true	Sort of true	True	Very true
11. I can name 5 things that other kids really like about me	1	2	3	4
12. I want my teachers to be proud of me.	1	2	3	4
13. I always do what my teachers tell me to do.	1	2	3	4
14. I get into fights with other kids.	1	2	3	4
15. I read for fun when I have free time.	1	2	3	4

	Not true	Sort of true	True	Very true
16. I like to spend time with my friends.	1	2	3	4
17. I play with my brothers (or sisters) a lot. (leave blank if only child)	1	2	3	4
18. I feel good about myself at school.	1	2	3	4
19. I have a hard time paying attention in math class.	1	2	3	4
20. I work hard at school.	1	2	3	4

	Not true	Sort of true	True	Very true
21. I play a lot in my neighborhood.	1	2	3	4
22. I don't like my brothers or sisters. (leave blank if you have none)	1	2	3	4
23. I always do what my teachers tell me to do.	1	2	3	4
24. I always get bored in school.	1	2	3	4
25. I love to read.	1	2	3	4

[1] Adapted with permission

1

	Not true	Sort of true	True	Very true
26. I am lonely in my neighborhood.	1	2	3	4
27. My family like the kind of kid I am.	1	2	3	4
28. My teachers like me.	1	2	3	4
29. I never get in trouble at school.	1	2	3	4
30. I trust my friends.	1	2	3	4

	Not true	Sort of true	True	Very true
31. My sisters (or brothers) are fun to be with. (leave blank if you have none)	1	2	3	4
32. I like school.	1	2	3	4
33. I can't sit still in class.	1	2	3	4
34. I don't have many friends.	1	2	3	4
35. My family are always proud of me.	1	2	3	4

	Not true	Sort of true	True	Very true
36. School is a fun place.	1	2	3	4
37. I get along with all of the kids in my classes.	1	2	3	4
38. I wish I did not get into so much trouble.	1	2	3	4
39. I like school.	1	2	3	4
40. I am a popular kid.	1	2	3	4

[1] Adapted with permission

Read the information on gardening, and then answer questions 1-11 by filling in the circle that goes with your answer

Gardening is growing and taking care of plants for their attractive flowers and for the vegetables or fruits to eat. We can garden outside in the ground and containers, and inside in containers.[1]

Instructions: Fill in the circle that goes with your answer.

Please Circle YES or NO for this question.	Not at all sure		Somewhat sure		Very sure	
	0	1	2	3	4	5
12. How sure are you that you can plan a garden?	○	○	○	○	○	○
13. How sure are you that you can find a place to garden?	○	○	○	○	○	○
14. How sure are you that you can grow a plant that produces a fruit or vegetable that you like to eat?	○	○	○	○	○	○
15. How sure are you that you can grow more than one kind of plant?	○	○	○	○	○	○
16. How sure are you that you can plant a seed that will grow into a small plant?	○	○	○	○	○	○
17. How sure are you that you can water a garden, so that it will stay alive?	○	○	○	○	○	○
18. How sure are you that you can weed a garden, to help plants grow?	○	○	○	○	○	○
19. How sure are you that you can garden no matter how busy your day is?	○	○	○	○	○	○
20. How sure are you that you can garden no matter how tired you may feel?	○	○	○	○	○	○
21. How sure are you that you can garden even if it is hot or cold outside?	○	○	○	○	○	○
22. How sure are you that you can garden even if you have homework?	○	○	○	○	○	○

[1] Adapted with permission

Vita

Andrew Carberry was born on December 21st, 1984 in Newport Beach, California. Before he can remember his family moved to Talbott, Tennessee, where he completed elementary, middle and high school. Andrew attended the College of William and Mary in Williamsburg, VA and graduated in May 2007 with a BS in Neuroscience. He became interested in the power of prevention while researching the effects of diabetes on the brain at the Center for Brain Health in New York University Medical Center. He subsequently pursued a dual degree in Nutrition, Public Health Nutrition concentration, and Public Health, Health Planning and Administration concentration, at the University of Tennessee, Knoxville. His degrees from the University of Tennessee were conferred in December, 2010.